ABLELink®

SW5001 Wireless Serial Server

User's Manual



Version 1.3

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TEL: 886-3-5508137

FAX: 886-3-5508131

http://www.atop.com.tw

Important Announcement

Published by

Atop Technologies, Inc.

2F, No. 146, Sec. 1, Tung-Hsing Rd.

Jubei, Hsinchu 30261

Taiwan, R.O.C.

Tel: 886-3-5508137

Fax: 886-3-5508131

www.atop.com.tw

FCC WARNING

Class A for this product

This product has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This product complies with FCC radiation exposure limits set forth for an uncontrolled environment. This model should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. IEEE 802.11b/g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

UL NOTICE FOR POWER SUPPLIER

All the series of SW5001 products are intended to be supplied by a Listed Power Unit marked with “LPS”, “Limited Power Source” or “Class 2” and output rate 9~30VDC, 1.0A minimum. Or, use the recommended power supply in “Optional Accessories”.

Contents

1. Introduction

1.1. Overview

SW5001 Wireless Serial Server is a gateway between wireless LAN or Ethernet (TCP/IP) and RS-232/RS-485 communications. It allows almost any serial devices to be connected to a new or existing wireless network. The information transmitted by Serial Server is transparent to both host computers (IP network over wireless LAN or Ethernet) and devices (RS-232/RS-485). Data from the wireless LAN or Ethernet (TCP/IP) is transmitted to the designated RS-232/RS-485 port and data from RS-232/RS-485 port is transmitted to the Wireless or Ethernet (TCP/IP) transparently.

In the computer integration manufacturing or industrial automation area, Wireless Serial Server is used for field devices to direct connect to network. Terminal Server (main control program run in SW5001) transforms whatever data received from RS-232/RS-485 to TCP/UDP port then connects devices to the IP network via a single application program or multiple application programs.

Many control devices provide the ability to communicate with hosts through RS-232/RS-485 however RS-232/RS-485 serial communication has its limitations. For instance, it is hard to transfer data through a long distance. With SW5001, it is possible to communicate with a remote device in the Intranet environment or even in the Internet and thus, increases the communication distance dramatically.

Flexible configuration options enable this unit to be setup remotely over IP network by Telnet, web browser, or Window utility. Packed in a rugged DIN Rail mountable case and 9~30V DC power input range, SW5001 is ideal for almost any industrial and manufacturing automation.

1.2. Features

- Single-port DIN-Rail mounting module.
- Metal housing with IP50 standard.
- 15KV ESD protection for serial ports
- IEEE 802.11g 54Mbps wireless network connectivity
- Support UDP, TCP server and client protocols for Virtual COM mode and pair connection
- Selectable RS-232/RS-485/RS-422 serial mode by software
- Configurable via console, telnet, built-in web server and Windows-based utilities
- Standard 2.4GHz High-gain antenna
- Upgradeable firmware via network

2. Getting Started

2.1. Packaging Include

- Atop Wireless Serial Server x 1
- 5 pins Terminal Block for Serial Connector x 1
- 3 pins Terminal Block for Power Connector x 1
- Mini DIN to DB-9 Cable x 1
- 4 dBi Antenna x 1
- Wall mount kits x 2
- Atop Wireless Serial Server quick start guide x 1
- Product CD containing configuration utility x 1

※ **NOTE: Notify your sales representative if any of the above items is missing or damaged.**

2.2. Ordering information

SW5001-WgN1	2-ports wireless serial server with Mini-Din serial connector

Optional Accessories

US315-12 (US)	AC100~240V US plug / DC12V 3 pin Terminal block for TB model
USE315-12 (EU)	AC100~240V EU plug / DC12V, 3 pin Terminal block for TB model
HG055	5.5dBi antenna, SMA (R) Female connector with 180cm cable

2.3. Interfaces

The SW5001 interfaces are shown by **Fig 1.**

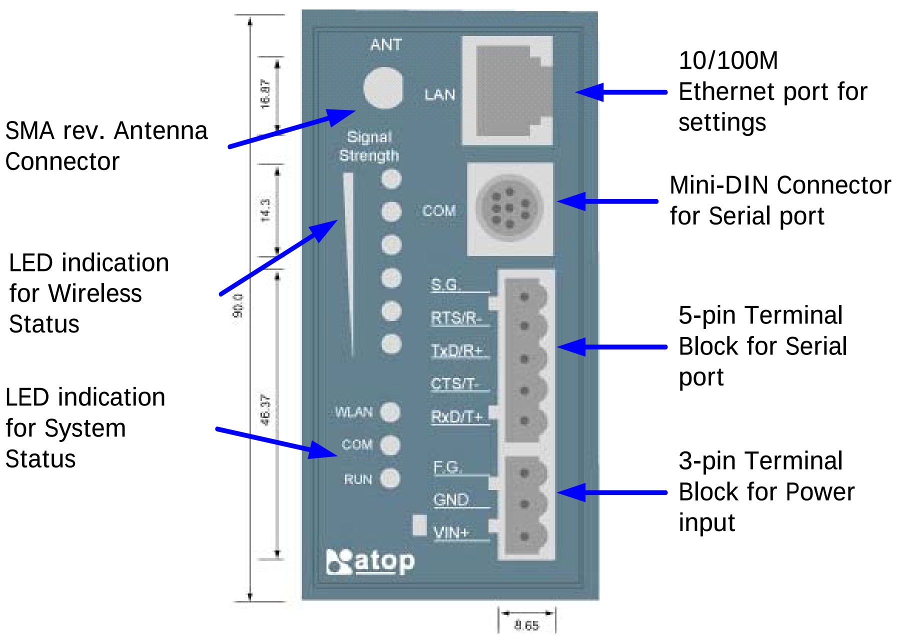


Fig 1. SW5001 Interfaces

2.4. Installation Procedures

- Prepare necessary cables, DC power adapter and serial connector.
- Place SW5001 under the access point signal coverage area, or connect SW5001 to Ethernet cable with RJ45 connector.
- Connect SW5001 serial port to serial device, make sure the connector and wiring of RS-232 is correct.
- Plug in SW5001 to DC-9-30V power source (3-pin terminal bock connector), buzzer will beep and the RUN LED will blink if SW5001 functions normally. For LED Status sees Appendix D4

Use **SerialManager** configuration utility on the product CD to check the status of SW5001. If it starts up successfully, User shall find the IP and MAC address of SW5001. User can change IP address, gateway IP address and subnet mask networking parameters of SW5001 according to user networking configurations.

3. Software Setup

Now the SW5001 hardware is installed and power is on, network IP configuration will be set in this section.

3.1. Default Settings

The SW5001 has two IP addresses one for Ethernet interface and another one for wireless network interface. These default settings are shown from under information

Default IP addresses

Interface	Device IP	Subnet mask	Gateway IP
LAN port	10.0.0.50.100	255.255.0.0	10.0.0.254
WLAN Port	192.168.1.1	255.255.255.0	192.168.1.254

The other default settings of SW5001 are shown in the following table

Property	Default Value
Ethernet Port	
IP Address	10.0.50.100
Gateway	10.0.0.254
Subnet Mask	255.255.0.0
WLAN Port	
IP Address	192.168.1.100
Gateway	192.168.1.254
Subnet Mask	255.255.255.0
Security	
User Name	**Admin**
Password	**Null** *(Leave it blank)*
Serial	
COM	9600/None/ 8/1,No flow control, buffer disabled, packet delimiter timer 1ms
Link Mode	TCP Server, Listen port 4660,No Filter, Virtual COM disabled
SNMP	
SysName of SNMP	Name
SysLocation of SNMP	Location
SysContact of SNMP	Contact

Table 1. Default settings of the SW5001 device

❋ **NOTE: Press reset button for 5 seconds then release the button to restart SW5001 to the default settings.**

❋ **Waring: Please avoid setting LAN and WLAN IP address in the same subnet. That may cause unexpected networking problem.**

3.2. IP Assignment

3.2.1. Configure IP by SerialManager Utility

Use **SerialManager** configuration utility that comes with product CD or diskette to configure the network parameters. For more details, please refer to **Appendix B1**.

Find new device and IP assignment

- Use **SerialManager Utility** for finding new device IP address, get device's current IP from table list.
- Re-assigned IP, network mask and gateway if need with **SerialManager Utility**.
- User can configure User ID, Password and Host Name with **SerialManager Utility**.

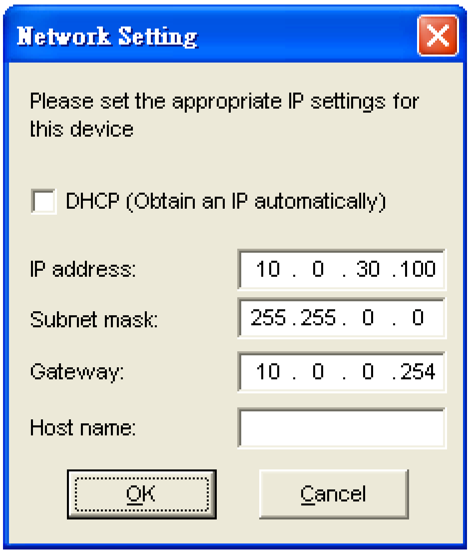


Fig 2. IP settings for SerialManager Utility tool

❈ **Note: All settings were NOT changed if user ID or password was incorrect.**

If there is more than one device using the same IP address in same Subnet. User has to correct mapping between MAC address & IP address by ARP commands.

ARP commands

ARP (address resolution protocol) commands can be used to assign a static IP address on SW5001 using its hardware MAC (media access control) address. The MAC address"0060E9-xxxxxx" is printed on the rear side of SW5001. The following figure shows how to use ARP command on MS-DOS command prompt window.

Example: Set IP **10.0.50.101** to **MAC address 00-60-E9-00-79-F8**.

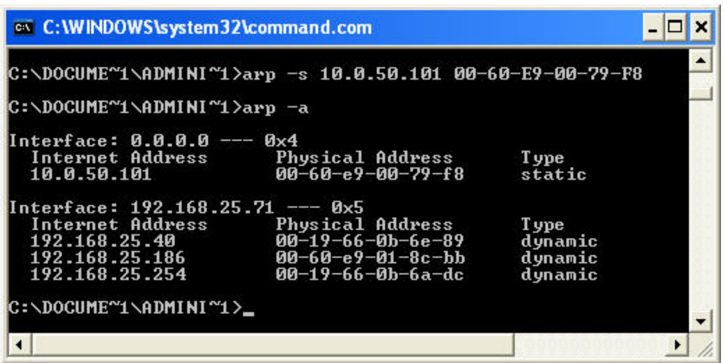


Fig 3. Map IP address to MAC address by ARP Command

❋ **Note: ARP commands can only be used to set a static IP address of SW5001**

- **arp –a** command show the current mapping IP and MAC addresses.
- **arp –s** “IP address” “MAC address” map the IP address to specify MAC address.

3.2.2. Configure IP by web interface

Use common Web browser, ex. Microsoft Internet Explorer or Mozilla Firefox, to configure the network parameters of SW5001.

- Open web browser, type in the **IP address** (default IP: 10.0.50.100) of SW5001 to be configured. Default user name is **admin** and default password is **null** (leave it blank).
- Configure IP settings from web **Network links page** then click “**Save Configuration**” to save settings.
- Click on ”**Restart**” button to make the change effective.

Please refer to contents of Web Configuration section for more details.

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3.2.3. Configure IP by Telnet utility

Use common Telnet utility, ex. Microsoft Hyper-terminal, to configure the network parameters of SW5001.

- Run command **telnet “IP address**” to telnet to SW5001 . **Default IP address is 10.0.50.100** and default password is **null** (leave it blank).
- Configure IP settings from **network settings** menu, and **restart** system after saved settings.

Please refer to Telnet Configuration section for more details.

3.2.4. Auto IP with DHCP

DHCP server will automatically supply an **IP address gateway address**, and **subnet mask** to SW5001. By default, the DHCP client function on SW5001 is disabled, user can activate the DHCP functions by the following steps

- Execute **SerialManager Utility**
- Click on the **IP address** (of SW5001)
- Click “***Config***” to pop-up the static IP Dialog Window
- Check on ”***Auto IP***”
- Click “***Config Now***” (The SW5001 will restart and obtain the IP from the DHCP server automatically)

3.3. TCP/IP Port Number

Default Port numbers of SW5001 is **4660** (1st port) and it is associated with the serial port **COM1**. After the application program connected to the TCP port 4660 on the SW5001, data of user’s application program are transmitted transparently to SW5001 and vice versa.

4. Application Connectivity

SW5001 provides Tunneling and Virtual COM operation mode. The SW5001 is designed to transmit data between one-or-more serial devices to/from one-or-more TCP/IP devices through **wireless** or **wire** Ethernet, so SW5001 can enhance the accessibility of the serial device through the ubiquitous TCP/IP based Ethernet. The connection distance limit is overcome by SW5001. Examples of these devices are PLC controllers, card readers, display signs, security controls, CNC controller, etc.

4.1. TCP & UDP Protocols

SW5001 can be operated in two most common protocols **TCP** and **UDP**.

4.1.1. Transmission Control Protocol (TCP)

TCP provides a connection and a byte oriented data stream with control parameters such as flow control, multiple ports option, and order delivery notification. Once the connection is established, data can be transmitted in both directions. TCP guarantees data is transmitted from one node to the other node(s) in orderly. The protocol also distinguishes the transmitted data for different applications (such as a Web server or an Email server) on the same computer.

For redundant or dual-network connectivity purposes, SW5001 offers two TCP operation Modes so users may choose for their specific application, TCP Server Mode and TCP Client Mode.

4.1.2. User Datagram Protocol (UDP)

UDP is a faster datagram delivery protocol. User can configure SW5001 to work in the UDP mode. UDP is connectionless protocol and can transmit multicast data to/from a serial device to one/multiple host computer. Because UDP is the connectionless protocol, UDP does not guarantee the reliability and orderly data streams like TCP protocol. Datagram may arrive out of order or lose without notice. But the advantage of UDP is the speed. UDP is faster and hence more attractive in time-sensitive applications.

4.2. Connectivity Topology

SW5001 is also equipped with Tunneling and Virtual COM operation modes. It is designed to transmit data to/from multiple serial devices and from/to multiple TCP/IP devices on Ethernet, so it can enhance the accessibility of the serial devices immensely**. Fig 4.** is the example of SW5001 connection topology.

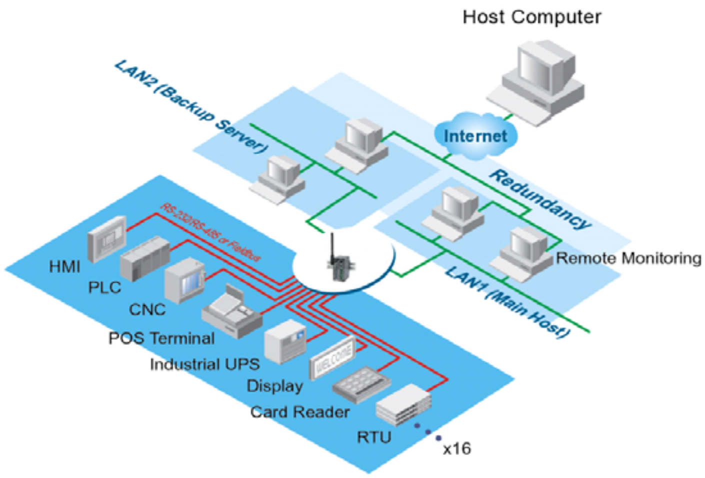


Fig 4. Typical Topology of SW5001 Connection

4.2.1. Virtual COM Mode

The **Virtual COM** software emulates a serial port with Internet or LAN topology. In the Virtual COM Mode, COM port data (RS232) is encapsulated to Ethernet data format. By creating a virtual COM port on a PC, the Virtual COM driver redirects communications from the virtual COM port to the destination IP address (and the designated port number) by encapsulated COM data into IP data. **Fig 5.** illustrates a Virtual COM connection diagram.

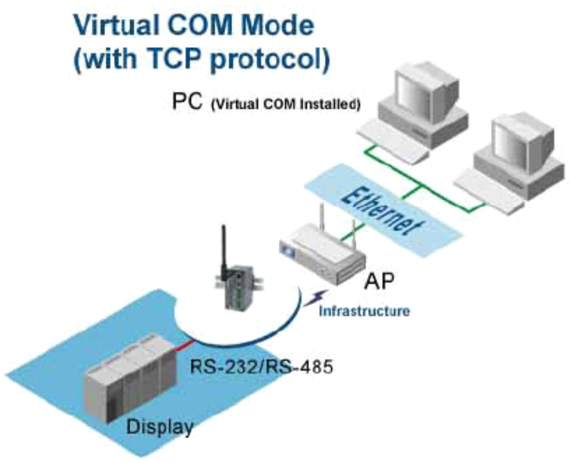


Fig 5. TCP Connection in Virtual COM Mode

TCP Server in Virtual COM Mode

SW5001 can be configured in the TCP server mode (PC as a client) with a unique IP and Port number, and SW5001 waits passively for the PC to establish a connection to. After the connection is established, PC can communicate to serial devices through SW5001.

Configure SW5001 to be TCP server

Using one of the three configuration methods (Telnet, Web, and console), User can configure SW5001 to be as TCP Server as following.

- Disabled the IP filter (default)
- Set the port number (default port is 4660 for COM1).
- If IP filter is enabled, only the assigned source IP is allowed to be connected to SW5001.

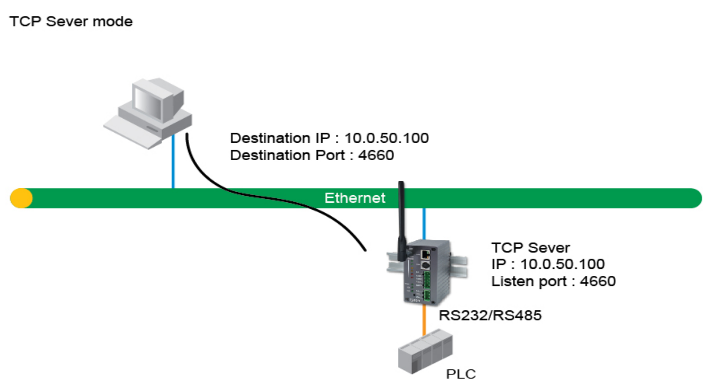


Fig 6. TCP Server in Virtual COM Mode

TCP Client in Virtual COM Mode

SW5001 can be configured to be TCP Client mode (PC as a server) to establish a TCP connection to an application server on PC, or the Remote Control Host. Once the connection is established, PC or Remote Control Host can exchange data with several serial devices at the same time through SW5001.

Configure SW5001 to be TCP client

User can configure SW5001 to be as TCP Client for example, from **Fig. 7**. PC, as a server, has IP address 10.0.0.100 and listening on port 1000. Each SW5001, connected with serial device, configured as TCP client mode with destination IP address 10.0.0.100 and the destination port 1000, and the IP filter is disabled (by default).

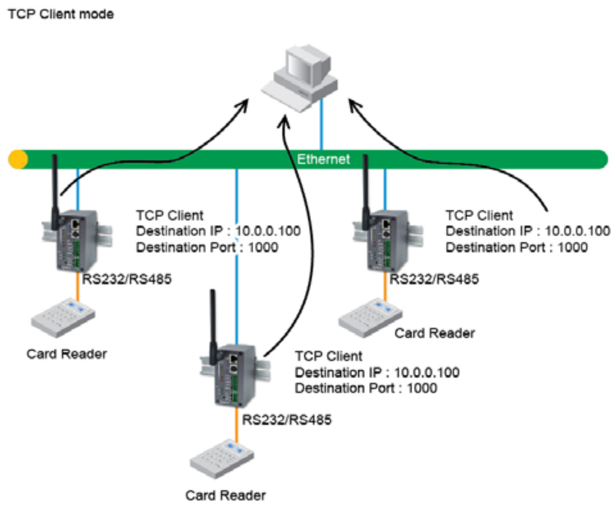


Fig 7. TCP Client in Virtual COM Mode

4.2.2. Tunneling Mode

Tunneling Mode is used for multiple serial devices to "talk" among one another through SW5001's through wireless LAN or wired Ethernet. This mode is particularly useful when two or more serial devices are far away. This mode can be used to extend the normal serial communication distance of 15 m to 100 m or longer.

One SW5001 can be configured to be the TCP Server Mode with serial device connected and also another SW5001 is configured as TCP client with serial device connected. After the connection is established, both serial devices can exchange data to each other transparently. For example, User can implement SW5001 tunneling mode for Master /Slave mode PLCs or between other serial devices.

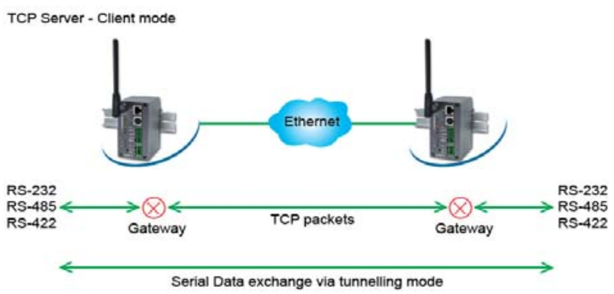


Fig 8. TCP Link in Tunneling mode

Configure SW5001 to Tunneling Mode

Using one of three configuration methods (Telnet, Web, or Console), user can configure SW5001 to TCP Server mode with a desired IP address and port, and with other SW5001 is configured as TCP Clients mode with Server IP and port as destination IP and port respectively.

❈ **Note: TCP client has to assign the destination IP and the destination port corresponding to TCP server's IP and listening port (example: TCP 4660 port).**

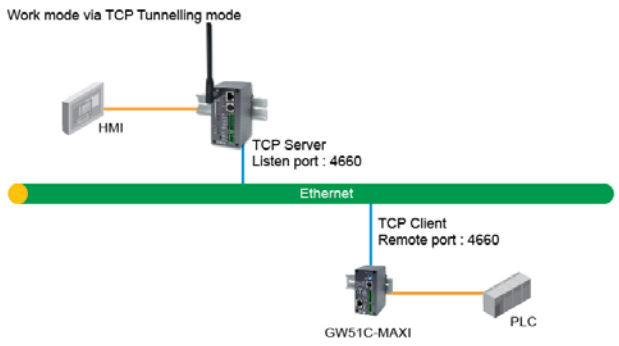


Fig 9. TCP Tunneling Mode

UDP

In UDP mode, User may exchange Multicast data from one SW5001 with multiple SW5001s, Vice versa is also true.

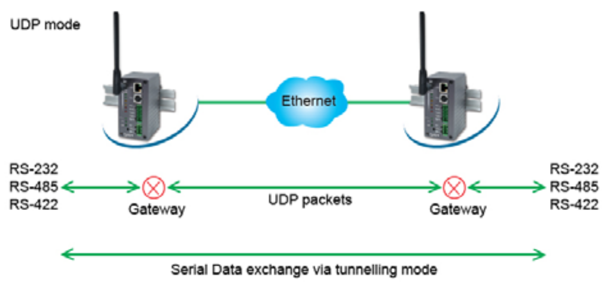


Fig 10. UDP Link in Tunneling mode

Configure SW5001 in UDP Mode

Use one of the three configuration methods (Telnet, Web, and console). user can configure SW5001 to UDP mode. In UDP mode, SW5001 can be configured to communicate to more than one node (Multicasting). Note that the **Multicast** IP address is limited by the Class of IP address and subnet mask. As an example, for a network of Class C of subnet 192.168.1.X and a subnet mask of 255.255.255.0, the maximum Multicast IP address to be configured is **four** destinations IP's.

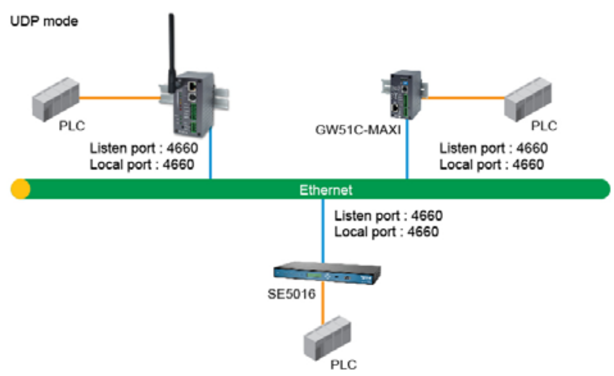


Fig 11. Multi-UDP Link in Tunneling Mode

5. Configure SW5001 by web interface

User has to assign IP address to SW5001 before working on web configuration operations. Please refer to section 3.2 for more detail.

5.1. Login to System

Open one of the web browsers, ex. Microsoft IE or Firefox etc. Enter the IP address of SW5001 on the URL. **Example:** *http://10.0.50.100 or http://**user-device-IP***

The following authentication screen shall appear. Enter **user name** and **password** then click on "**OK**". The default user name is **admin** and password is **null** (leave it blank).

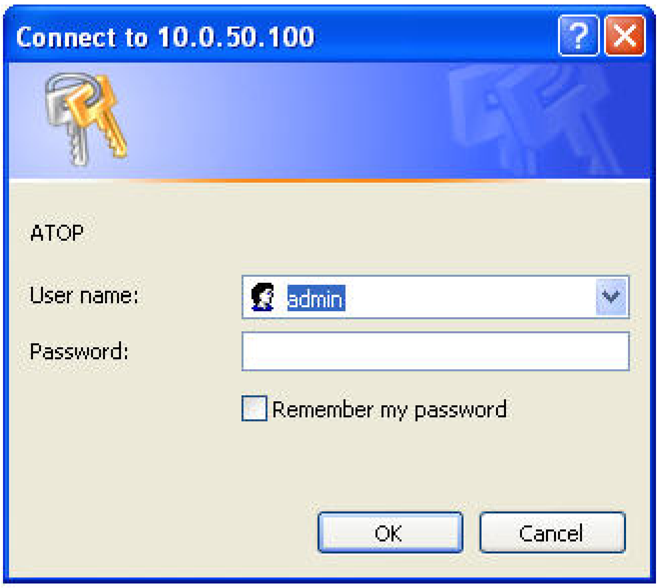


Fig 12. Authorization request for system security

The overview screen shall appear (**Fig. 13**).

5.2. General Information

This system overview window gives the general information on SW5001, included Network, and Serial information.

Overview

The general device information of ATOP-Serial Server.

Device Information	
Model Name	SW5001
Device Name	0060e9023638
Kernel Version	1.15
AP Version	1.28

Network Information		
LAN	MAC Address	00:60:E9:02:36:38
	IP Address	10.0.50.123
WLAN	MAC Address	00:16:E6:3F:FF:4F
	Region	Americas
	IP Address	192.168.1.1
	Status	default 00:13:46:FE:B0:2E 100%

COM 1 Information	
Serial Interface	RS-485
Link Mode	TCP Server
Baud Rate	7
Parity	None
Data bits	8
Stop bits	1
Flow Control	None
Link Status	SERVER MODE: Listening[0]

Fig 13. Overview for system information by Web Interface

Device Information

SW5001's system information includes **model name**、 **Device Name**、 **Kernel version** and **AP version**. The information is read only and is attributed from another setting page or system status

Device Information	
Model Name	SW5001
Device Name	0060e9023638
Kernel Version	1.15
AP Version	1.28

Fig 14. Device Information from Overview web page

Networking information

Networking information fields are displayed both '**LAN & Wireless LAN** (WLAN) Information. The information provided **LAN MAC address, LAN IP address, WLAN MAC address, WLAN IP address and WLAN status**

Network Information		
LAN	MAC Address	00:60:E9:02:36:38
	IP Address	10.0.50.123
WLAN	MAC Address	00:16:E6:3F:FF:4F
	Region	Americas
	IP Address	192.168.1.1
	Status	default 00:13:46:FE:B0:2E 100%

Fig 15. Network Information from Overview web page

Serial Information

SW5001 COM1 information includes **UART mode, link mode, baud rate, parity, data bits, stop bits, flow control and link status**. The COM1 information is read only and is attributed from Serial settings of COM1 Port of SW5001.

COM 1 Information	
Serial Interface	RS-485
Link Mode	TCP Server
Baud Rate	7
Parity	None
Data bits	8
Stop bits	1
Flow Control	None
Link Status	SERVER MODE: Listening[0]

Fig 16. Serial Information from Overview web page

5.3. Network Configurations

There are four items allowed to change on Network page, included **LAN, WLAN, DNS** and **SNMP** Information.

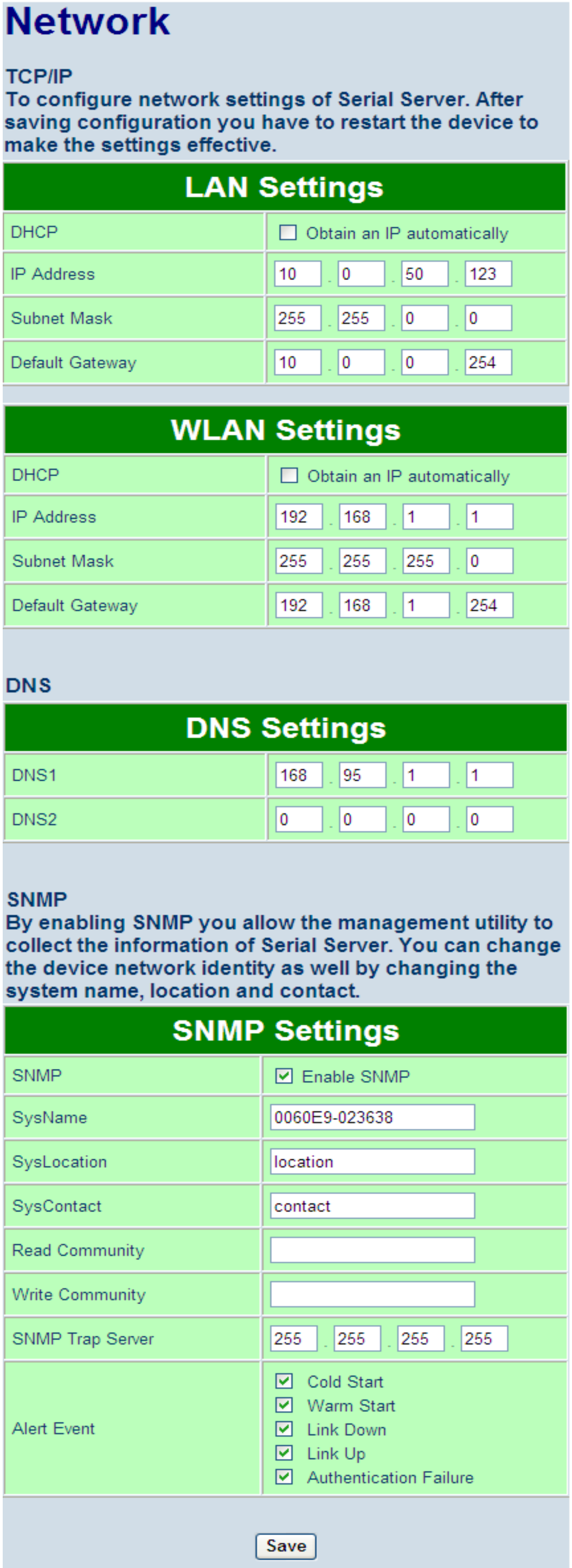


Fig 17. Network information by Web page

5.3.1. LAN Settings

Operation: [Network] → [LAN Setting]

Click on the "**Network**" link and the following screen shall appear. Fill in IP information on TCP/IP field. Alternatively, click on DHCP to automatically obtain **IP address**, **gateway** and **subnet mask** information.

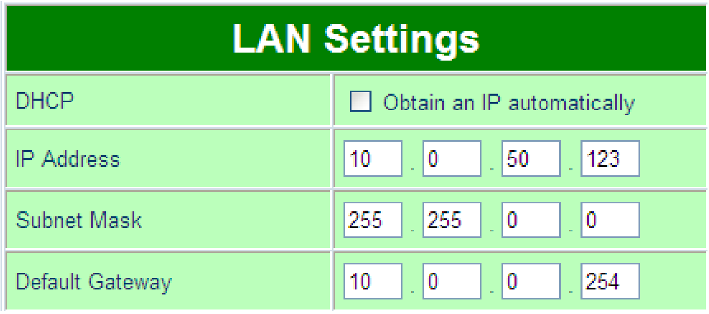


Fig 18. LAN Setting from Network web page

5.3.2. WLAN Settings

Operation: [Network] → [WLAN Settings]

Click on the ***"Network"*** link Mode and the following screen shall appear. Fill in **WLAN IP** information on WLAN settings fields. Alternatively, User may activate DHCP client function by checking on "***Obtain an IP automatically***" field to automatically obtain **IP address**, **gateway** and **subnet mask** from DHCP server.

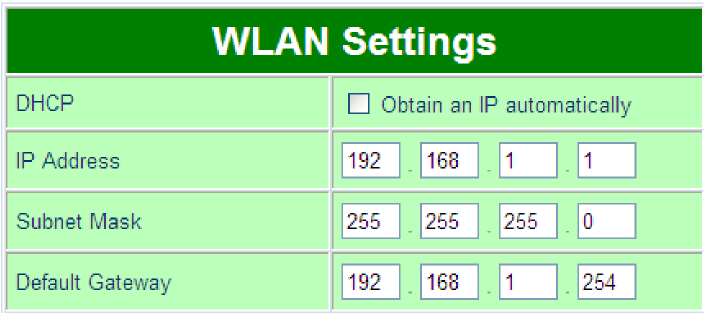


Fig 19. WLAN Setting from Network web page

5.3.3. DNS Settings

Operation: [Network] → [DNS Settings]

Click on the ***"Network"*** link and the following screen shall appear. Fill in DNS information on **DNS Settings** field. Alternatively, User can configure DNS by checking on "***Obtain an IP automatically***" field in **LAN Settings** or **WLAN Settings** fields to automatically obtain DNS from DHCP server.

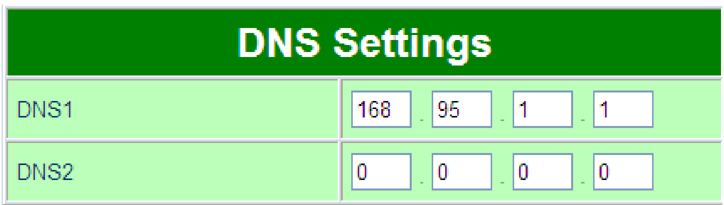


Fig 20. DNS Setting from Network web page

5.3.4. SNMP Settings

Operation: [Network] → [SNMP Settings]

Click on the ***"Network"*** link and the following screen shall appear. Check on "***Enabling Settings***" field. Fill in desired **SysName**、 **SysLocation**、 **SysContact** information on SNMP Settings fields. The changes of SNMP Settings will take effect only after the SW5001 restarted.

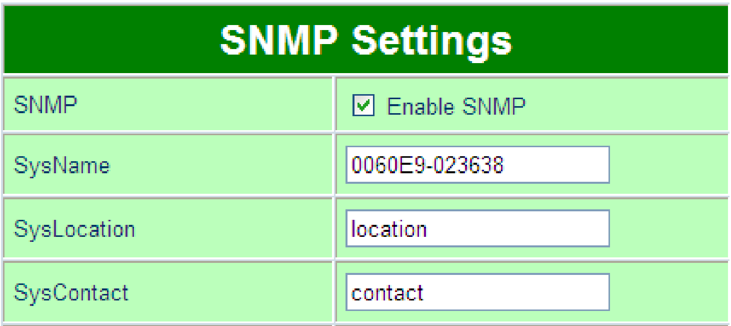


Fig 21. SNMP Setting from Network web page

5.4. Wireless Configuration

There are three fields of information on Wireless Configuration page which are Default, Current and Site-Survey Information. Click on "***Wireless***" link and the following screen shall appear.

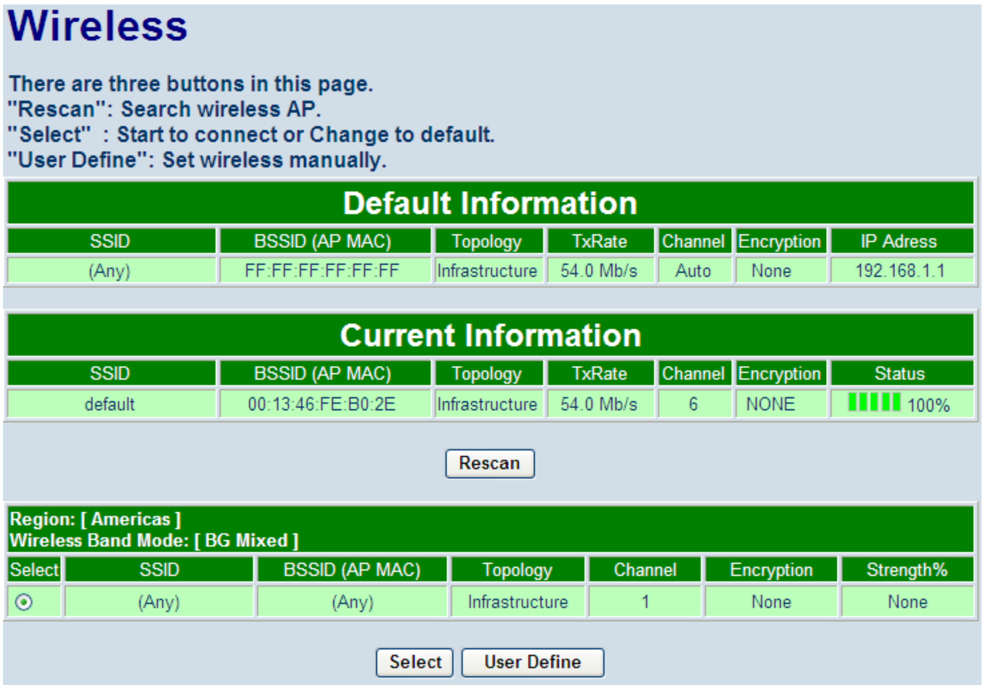


Fig 22. Wireless information by Web page

There are 3 buttons can be operated on Wireless page

- **Rescan:** Click on the "***Rescan***" button, and SW5001 will start site-survey procedures, then on the site-survey list will display the access points founded.
- **Select:** On the site-survey list, click on radio button to attach the access point you wanted
- **User defined:** Users can also define information for wireless parameters by themselves.

5.4.1. Wireless Detail Settings

User can configure wireless LAN parameters through web pages. Pop-up windows page will be shown for advanced wireless settings if "**select**" or "**user define**" button was clicked (**FIG. 23**). For example, User can configure **SSID**, **wireless topology**, **Wireless Band Mode**, **TxRate**, **Channel**, **Authentication**, and **Encryption** of the access point that SW5001 want to connect to.

The advanced wireless settings also include roaming threshold. User can configure roaming signal threshold for the SW5001. SW5001 will change to the stronger wireless signal access point, if the original access point's signal is less than roaming threshold.

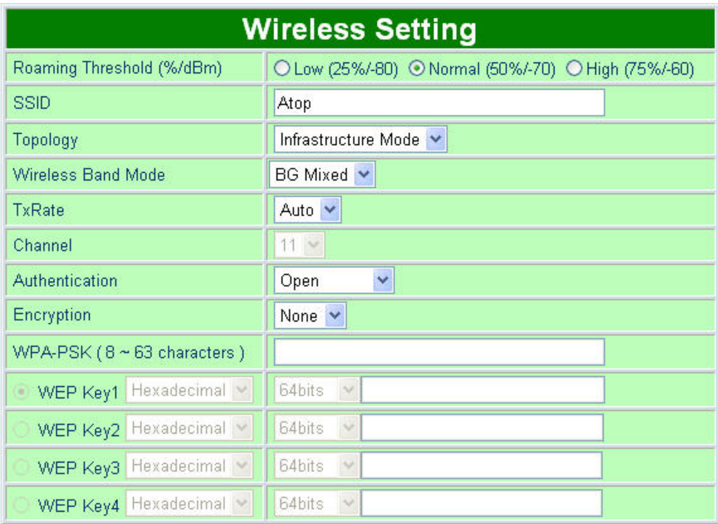


Fig 23. Pop-up Windows for Wireless Detail settings

5.4.2. Sample Wireless Application Cases

Below are some screen shot examples of **wireless detail settings** for different wireless security schemes.

Attach access point without Authorization

- **Topology**: Infrastructure
- **Channel**: Auto-assignment from Access point
- **Authentication**: open
- **Encryption**: None

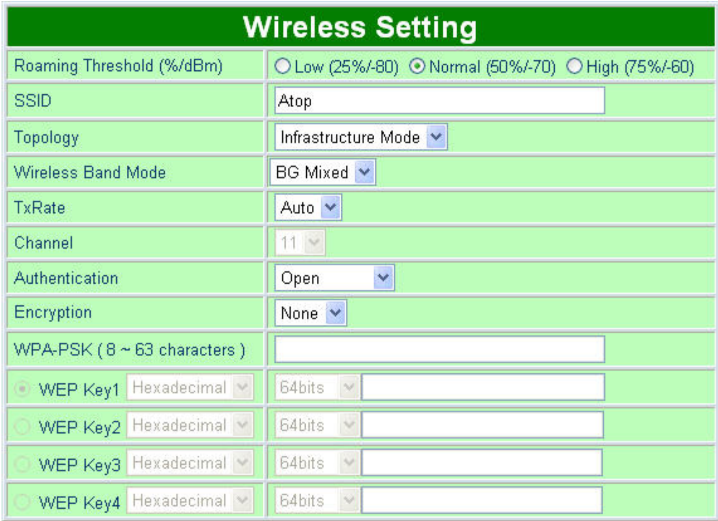


Fig 24. Open Authorization and no Encryption

Attach access point with WEP

- **Topology:** Infrastructure
- **Channel:** Auto-assignment from Access point
- **Authentication:** share
- **Encryption:** WEP
- **WEP Key1~4:** Hexadecimal or ASCII / 64 or 128bit / <WEP Key>

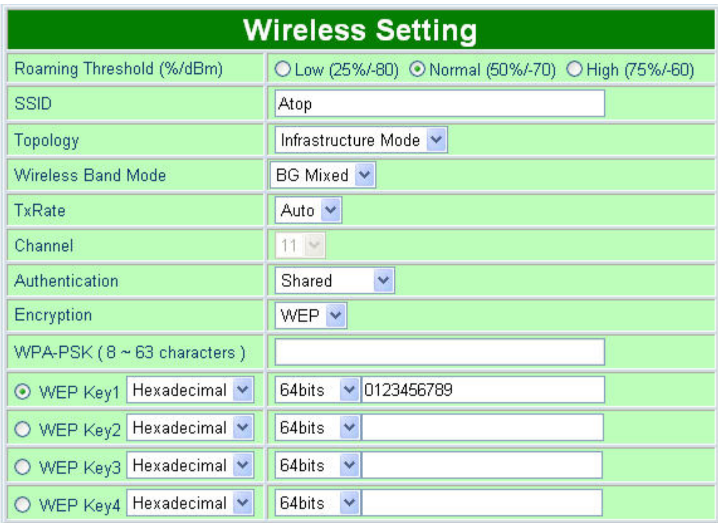


Fig 25. Share Authorization and WEP Encryption

❋ **Note1: Enter 5 ASCII value or 10 Hexadecimal digit if select WEP64 encryption.**

❋ **Note2: Enter 13 ASCII value or 26 Hexadecimal digit if select WEP128 encryption**

Attach access point with WPA-PSK

- **Topology:** Infrastructure
- **Channel:** Auto-assignment from Access point
- **Authentication**: WPA-PSK
- **Encryption**: TKIP or AES
- **WPA-PSK:** 8~ 63 Characters

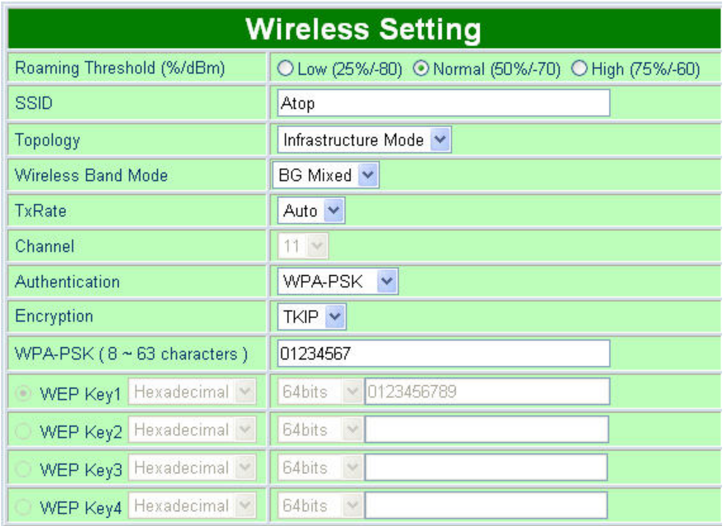
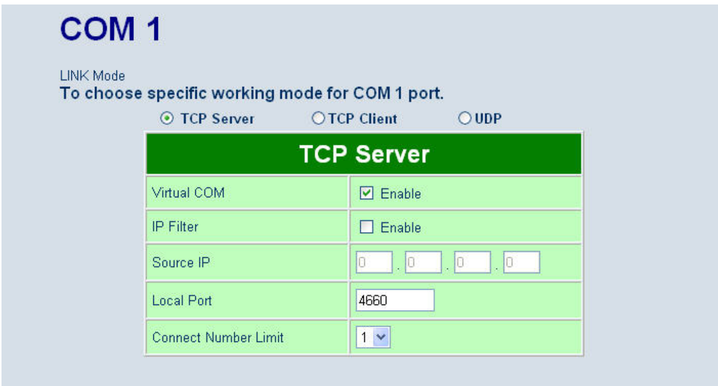


Fig 26. WPA-PSK Authorization and TKIP Encryption

5.5. COM Port Configuration

Here User can configure **Serial parameters**, include alias, baud rate, parity, data bit and type of flow control defined by user.



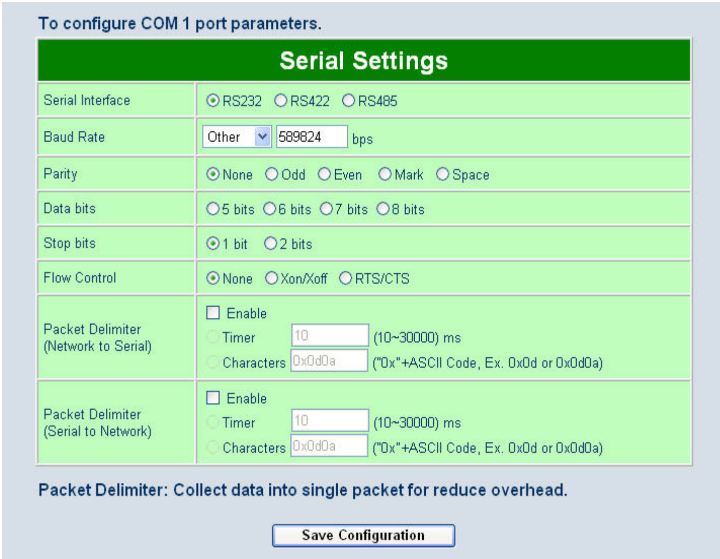


Fig 27. COM port Information Web Page

5.5.1. Link Mode Settings

- Click on the ***"Serial"*** link and the **Fig. 27** screen will appear.
- Fill in Serial parameter information on **Serial Settings** field.
- Click on "***Save Configuration***" button to save the changes.

5.5.2. TCP Server Mode

TCP Server mode is default Link mode of **Serial Settings**, and it can wait for connecting requirement from remote host PC which running "serial-to IP" utility or setting SW5001s in tunneling mode. User has to configure listening port to allow client establish connection to this server. Default port number of SW5001 is 4660.

IP filtering function is a simple **ACL** (Access Control List). It can be disabled by setting FILTER_IP to "0.0.0.0".

User can configure one or group IP for **source IP**. If IP filter is enabled, only source IP assigned can be connected to SW5001.

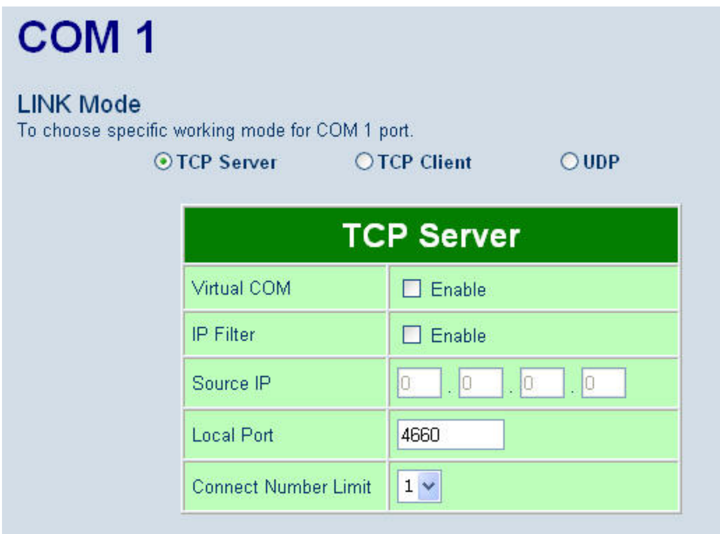


Fig 28. TCP Server in Link mode

❈ **Note: Enable Virtual COM mode if the remote site PC's "Serial to IP" tool is installed.**

5.5.3. TCP Client Mode

User may enter destination IP & port (default: 4660) to establish connection of counter-pair (remote) host (For example, another SW5001, or PC for data-collection). SW5001 can support two destination hosts simultaneously.

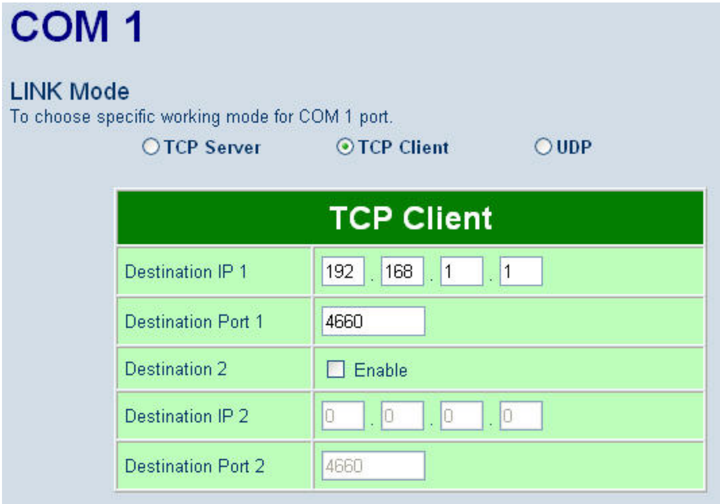


Fig 29. TCP Client in Link mode

5.5.4. UDP Mode

SW5001 can be configured in a **UDP mode** to establish connection using **Unicast** or **Multicast** data from the serial device to one or multiple host computers. Vice versa is also true. For example, the original **RS-422/ RS485** bus can be transferred and extended connected distance by SW5001s.

The destination IP is assigned by single IP or group IPs, The configuration is limited by the Local Listening Port. For example, on SW5001 listening port is 4660 which receive data sending from the host computers. SW5001 can support up to **4-group** IPs for UDP connection, if users needed.

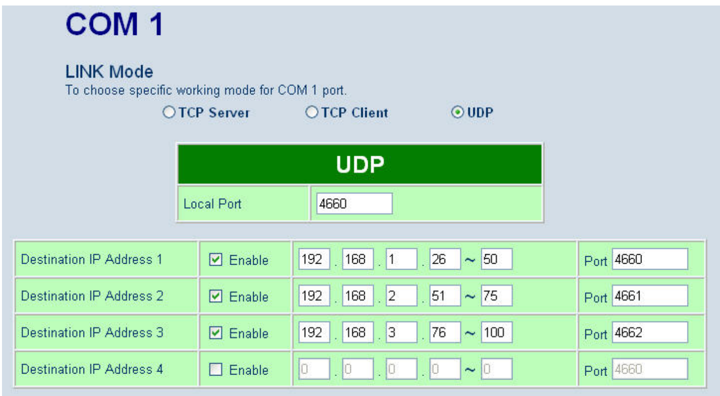


Fig 30. UDP protocol in Link mode

❈ **Note: In this phase, UDP mode does not support Virtual COM mode.**

5.5.5. Serial Settings

This filed can be configured with serial parameters for SW5001. Here User can configure Serial parameters, include **UART Mode**, **baud rate**, **parity**, **data bit** and **type of flow control.**

- **Configure UART Mode:** RS-232 or RS-485 or RS-422
- **Baud rate:** 1200/2400/4800/9600/19200/38400/57600/115200
- **Parity:** None or Odd or Even or Mark or Space
- **Data bits:** 7 or 8
- **Stop bits:** 1 or 2
- **Flow control:** None or Xon/Xoff or Hardware (RTS/CTS)

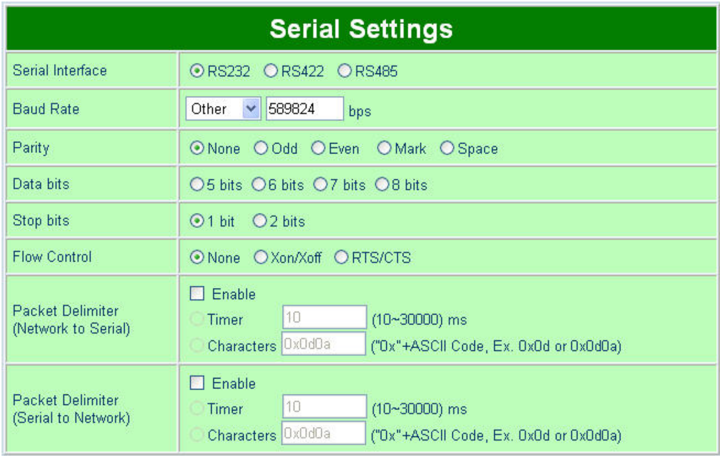


Fig 31. Serial Communication Settings from Web Page

※ **Note: The isolation, SW5001-WgN1Sis (TB), only support max 230Kbps baud rate.**

5.5.6. Delimiter Settings

Packet delimiter

Packet delimiter is a way of controlling the number of packets in a serial communication. It is designed to keep packets in track. SW5001 provides two ways in parameter setting: (1) **Packet delimiter by timer** and (2) **packet delimiter by Character pattern**. By default, packet delimiter timer is 10 ms. the range of packet delimiter timer is **10** to **30,000** msec. For Character pattern terminator, if "character pattern is selected and a data stream ended with "0x0a04", then the entire data buffer of the serial device is transmitted.

User can also choose character pattern as the packet delimiter indicated.

5.6. Configure System

There are five subsystems for system settings, included **Time**, **WLAN Region**, **Security**, **Set to default** and **Restart**.



Fig 32. Subsystem menu of system settings Web Interface

5.6.1. Configure Time by NTP Service

Operation: System→Time

User can set date and time manually by fill in "***Set Date and Time manually***" field. User can also configure **NTP Server** to obtain Network time automatically.

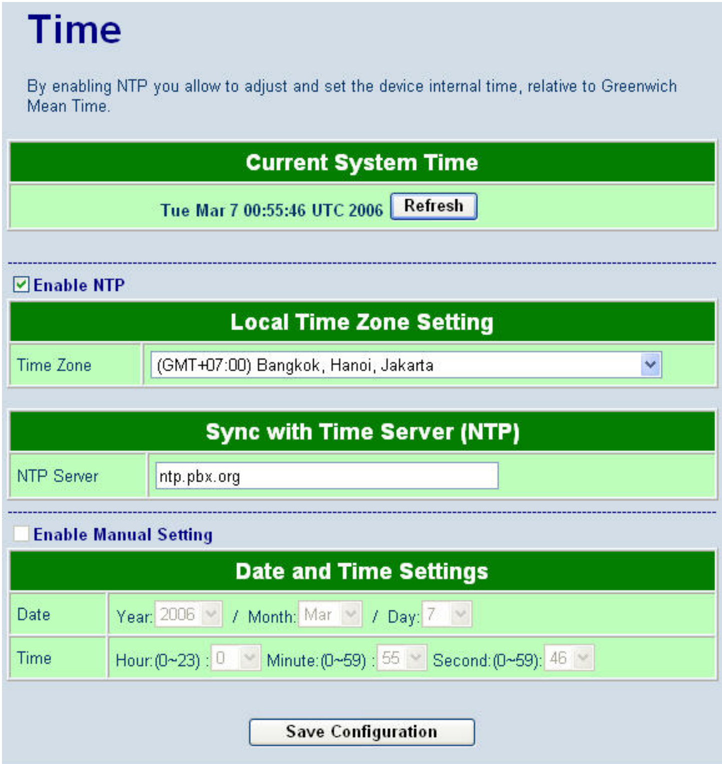


Fig 33. Time service settings from System web page

5.6.2. WLAN Region

Operation: System->WLAN Region

Click on the "**WLAN Region**" link and the following screen shall appear (**Fig. 34**).



Fig 34. Time service settings from System web page

Select the country from drop-down list box to country that user wants to implement the SW5001. This selection will be effected to the bands of channel of SW5001 wireless mode. For example, the normal system level channel configurations for deployments are channels 1, 6 and 11 for FCC countries and 1, 5, 9 and 13 for European Union countries.

5.6.3. Security (change the Password)

Operation: System->Security

Click on the "***Security***" link and the following screen shall appear (**Fig. 35**).

Enter the old password on "***Old Password***" field then enter the new password on "***New Password***" and the "***Verified Password***" fields, and then click on "***Save Configuration***" to update the password. The maximum is 8 characters.

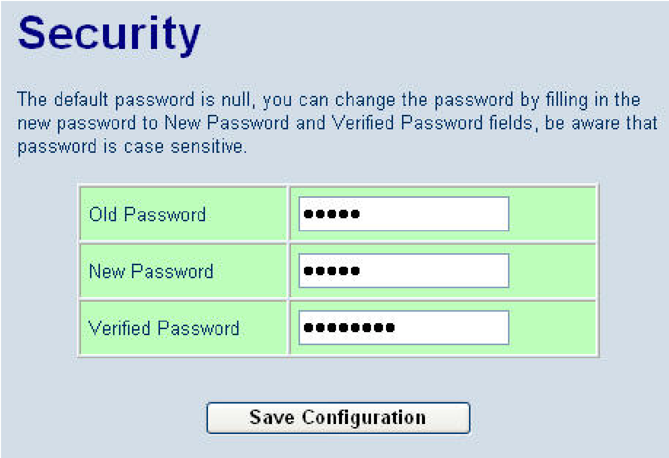


Fig 35. Change password from System Security Page

※ **Note: User may press the default reset key to reset password to the default value(blank)**

5.6.4. Restoring Factory Default Configurations

Operation: System→ Set to Default

User can click on "***set to default and restart***" button to restore SW5001's settings to factory default (**Fig. 36**).



Fig 36. Set all parameters to factory default by Web Interface

5.6.5. Restart System

Operation: System→ Restart

The changes of networking parameters will take effect only after the SW5001 is restarted. User can restart the SW5001 manually by click on Restart button on the restart menu web page (**Fig 37**).



Fig 37. Restart system by Web

6. Telnet Configuration

User can also use Telnet utility to change SW5001 configuration settings.

- Open Ms-DOS command prompt window or other telnet tools
- Enter the "**IP address**" of the SW5001 (For example, **Telnet 10.0.50.100**). The system then prompts for username and password, the default username is "**admin**" and the default password is **null (blank)**.

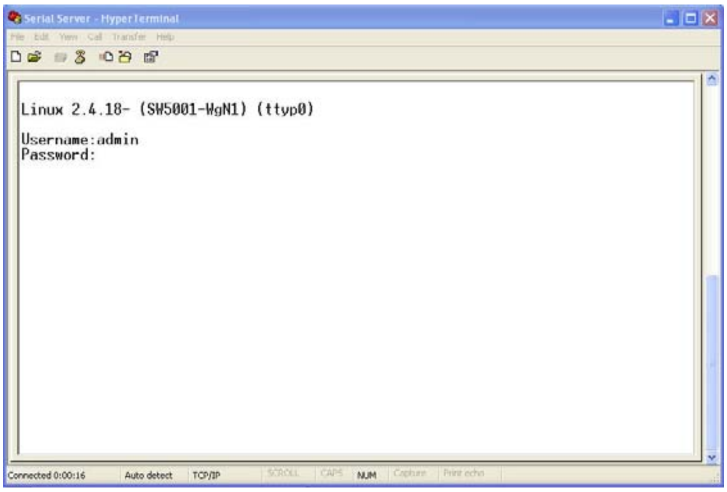


Fig 38. Login into System by Telnet

Then the following main menu shall appear

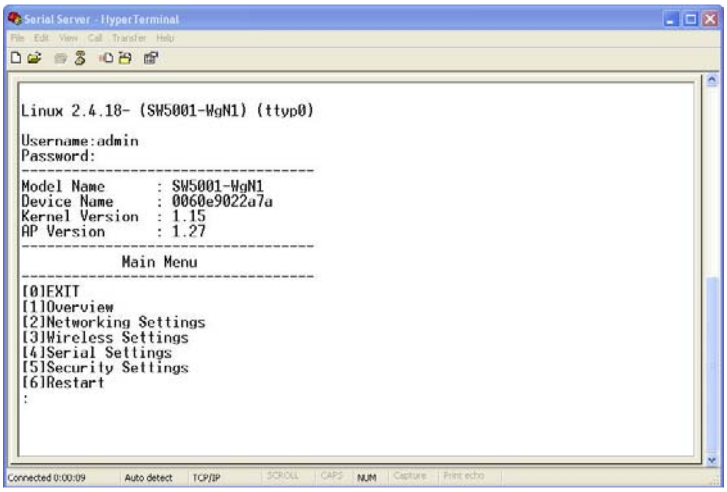


Fig 39. Overview information by telnet

- If the SW5001 does not receive any command within **1 minute**, Telnet will be terminated automatically.
- The changes of networking parameters will take effect only after the SW5001 is restarted.

6.1. General Information

Operation: [Main]→[1 Overview]

Select "**1**" from "***Input choice (0~6) and enter:***" to enter "**overview page**.

This system overview window gives the general information on **Ethernet & WLAN IP**, **MAC address, SNMP information, kernel and AP version, and the connection status** of the SW5001 (**Fig. 39**).

The following overview information shall appear.

Device Information:

Model Name: SW5001's Model

Device Name: [Allows for changes in SNMP settings]

Kernel Version: [Read Only, Generated by system]

AP Version: [Read Only, Generated by system]

Ethernet Information:

MAC: [Read Only]

IP: [Allows for changes in Network Page]

WLAN Information:

MAC: [Read Only]

IP: [Allows for changes in Auto IP of Network Page]

Connected: [SSID name, if Wireless SW5001 is connected]

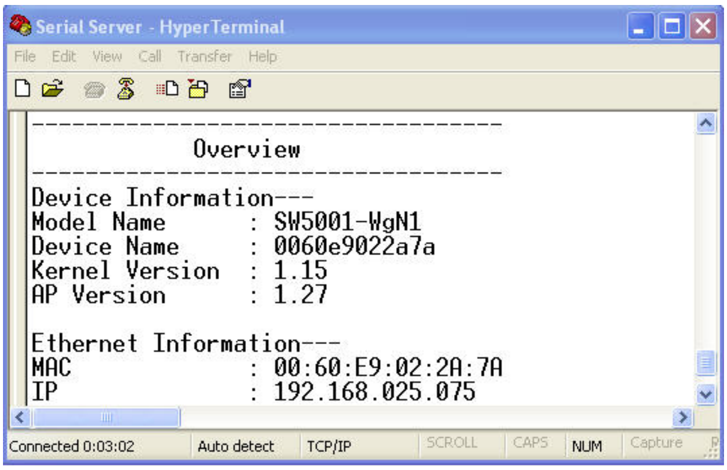


Fig 40. System Information from Overview

DNS Information:

DNS1: [IP address of 1st DNS Server, Allows for changes in Auto IP of Networking Page]

DNS2: [IP address of 2nd DNS Server, Allows for changes in Auto IP of Networking Page]

SNMP Information:

SNMP Status: Enable [or Disable, Allows for changes in Networking Page]

SysName: [Allows for changes in Networking Page]

SysLocation: [Allows for changes in Networking Page]

SysContact: Allows for changes in Networking Page]

Serial Information:

UART mode RS485/RS232/RS422

Link Mode: TCP Server [or TCP Client/UDP Mode, Allows for changes in Serial Page]

Baud rate: 115200 [or 1200/2400/4800/9600...Allows for changes in Serial Page]

Parity: None [or Even/Odd/Space/Mark...Allows for changes in Serial Page]

Data bits: 8 [or 7 (bits).Allows for changes in Serial Page]

Stop bits 1 bit or 2 bits

Flow Control None, Xon/Xoff, RTS/CTS

6.2. Networking Configuration

Operation: [Main]→[2 Networking]:

Select "**2**" on "**Input choice (0~6) and enter**:" to enter **Networking settings** page.

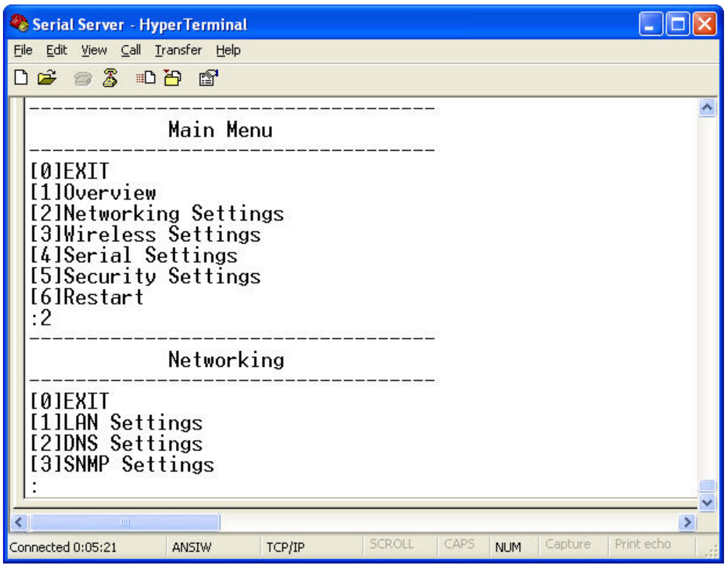


Fig 41. Networking Settings by Telnet

❈ **Note: Press "0" key to return to the previous menu**

This section allows for changes in **IP address, subnet mask, gateway IP address and SNMP** information. Please note that setting changes will not take effect until the SW5001 is restarted.

6.2.1. LAN Settings

Operation: [Main]→[2 Networking]→[1 LAN Settings]

Select "**1**" from "***Input choice (0~3) and enter on Networking page***:" to enter **LAN Settings page**. The **MAC address**, **IP address**, **subnet mask**, **gateway address**, and **IP mode information** will be shown (**Fig. 42**). User also can set **IP, Netmask, Gateway, and IP mode** of **LAN interfaces** by enter the corresponding menus and values. For example, **enter 1** for setting the **IP address** on LAN interface.

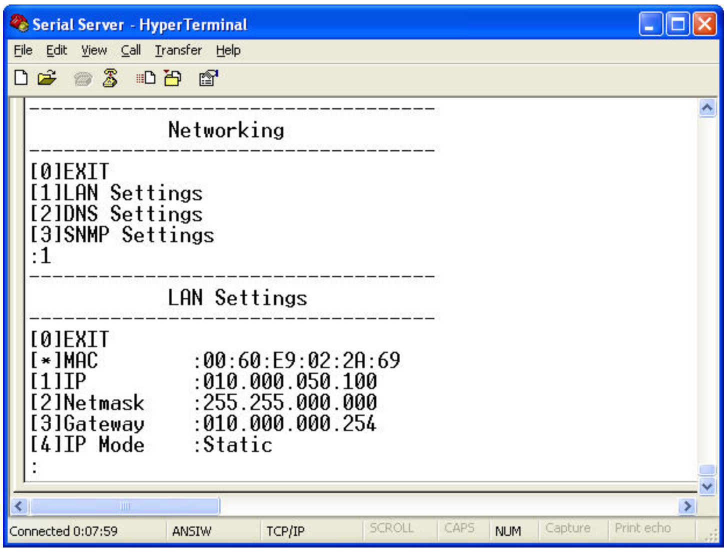


Fig 42. LAN Settings by Telnet

6.2.2. DNS Settings

Operation: [Main]→[2 Networking]→[2 DNS Settings]

Select "2" from "***Input choice (0~3) and enter on Networking page***:" to enter **DNS Settings page.**

Fill in the DNS information DNS1 or DNS2 or both according to user DNS server (**Fig. 43**).

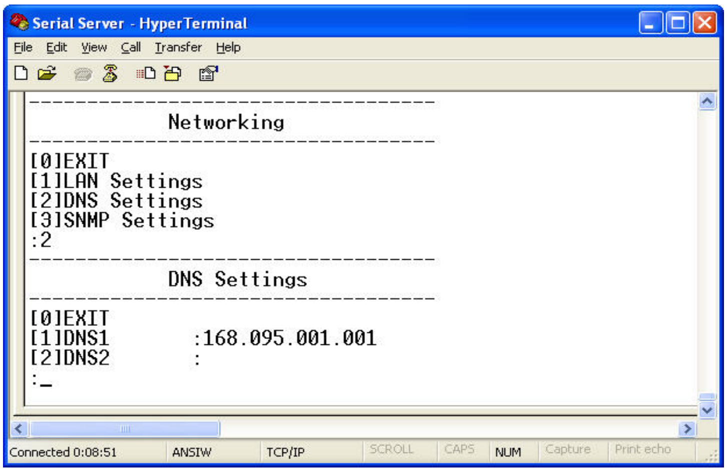


Fig 43. DNS Settings by Telnet

6.2.3. SNMP Settings

Operation: [Main]→[2 Networking]→[3 SNMP Settings]

Select "**3**" from "***Input choice (0~3) and enter on Networking page***:" to enter **SNMP Settings page.** User can enable/disable SNMP, and set network identification information on **SNMP Settings page.** The changes will not become effective until SW5001 is restarted

SW5001 basically supports get/set SNMP parameters, these are **SysName** (System Name), **SysLocation** (System Location) and **SysContact** (System Contact). These fields will response and supply basic system information from standard SNMP query. User can set the SNMP system parameters by enter the corresponding menus and values. For example, **enter 2** for changing the **SysName** then enter the desired name.

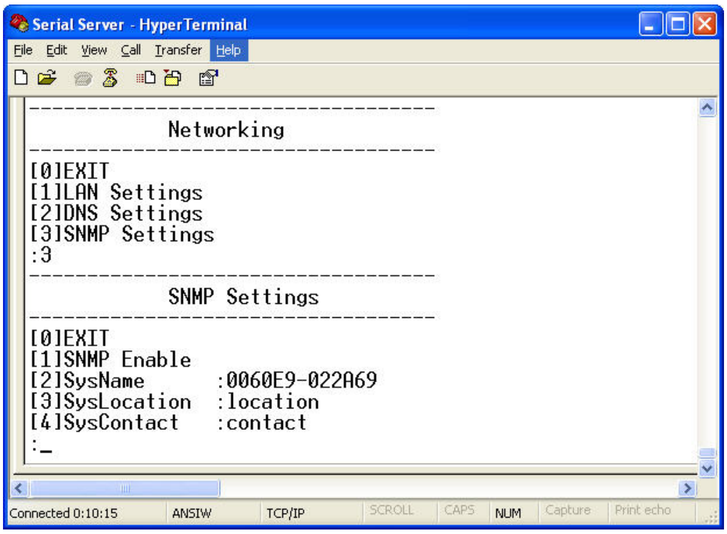


Fig 44. SNMP Settings by Telnet

6.3. Wireless Configuration

Operation: [Main] → [3 Wireless Settings]

Select "**3**" from "***Input choice (0~6) and enter***:" the following screen shall appear (**Fig. 45**).

User can configure wireless **IP**, **Netmask**, **Gateway**, **IP mode**, and **Region** by enter the corresponding menu and corresponding values.

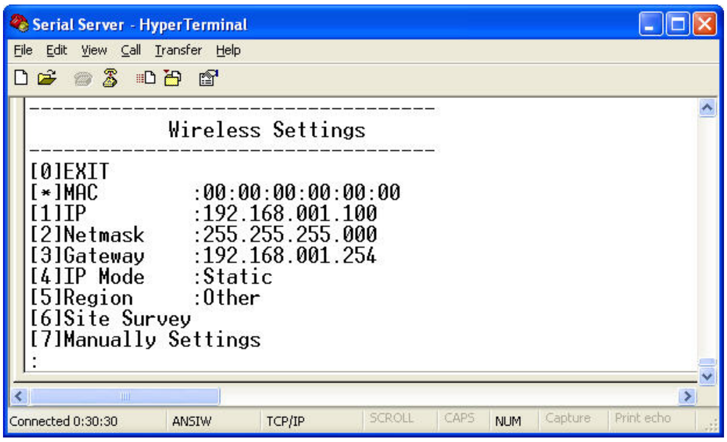


Fig 45. Configure Wireless Settings by Telnet

6.3.1. Wireless IP, Netmask, Gateway and IP mode Settings

Operation: [Main] → [3 Wireless Settings]→ [1 IP]/[2 Netmask]/ [3 Gateway]/[4 IP Mode]

User can configure SW5001 **Wireless IP/Netmask/Gateway** by enter **1/2/3** at **Wireless Settings page** and enter the desired **IP/Netmask/Gateway address**.

User can also configure **wireless IP mode** by enter **4** at **Wireless Settings pag**e and enter **1 for static IP** address or enter **2 for DHCP** mode (**Fig. 47**).

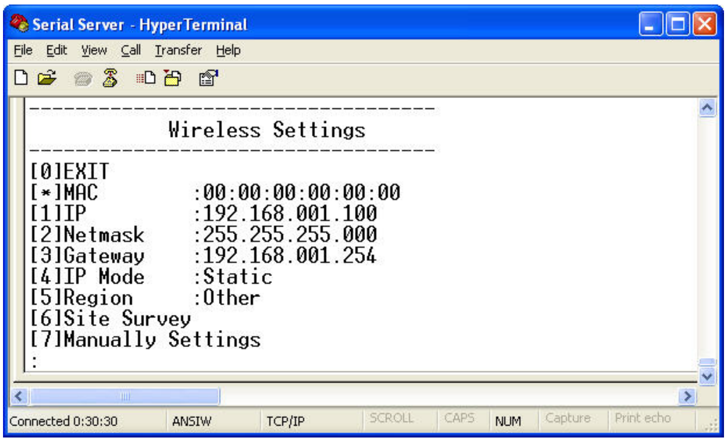


Fig 46. Configure Wireless Networking by Telnet

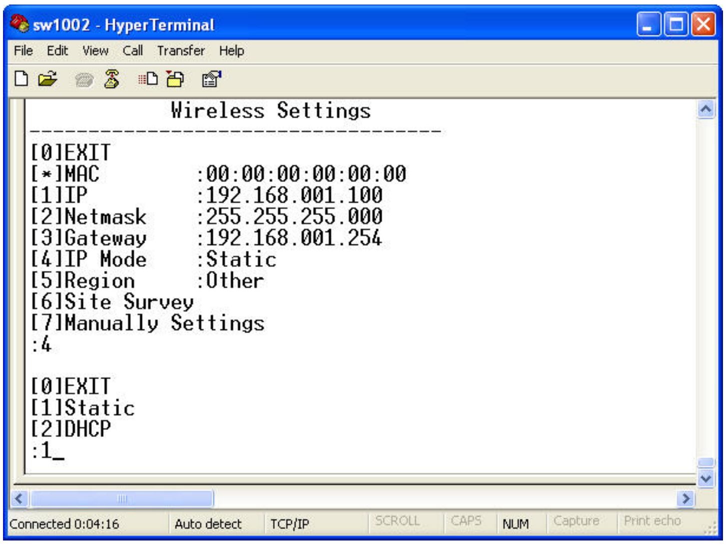


Fig 47. Configure Wireless IP mode by Telnet

6.3.2. Configure Region

Operation: [Main] → [3 Wireless Setting] → [5 Region]

WLAN Region is the geography area that user want to implement the SW5001. Because the wireless channel implement the frequency band differently in a different regions. User can configure the **WLAN Region** by **enter 5** at **Wireless Settings page** and enter the menu according to user's region.

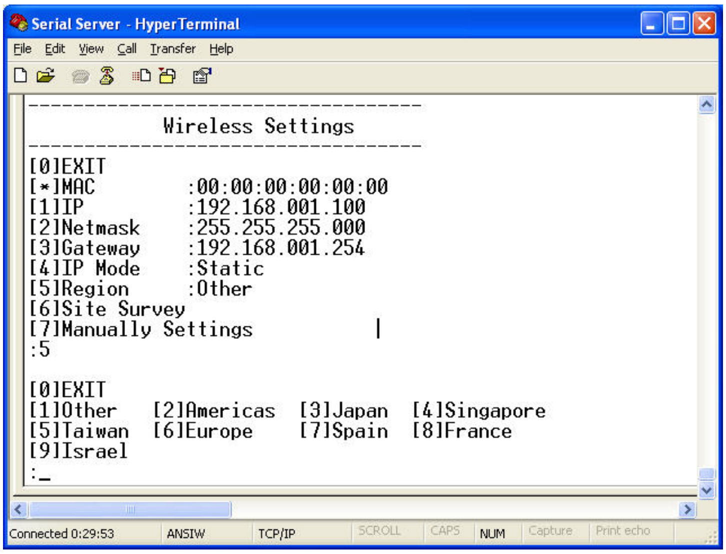


Fig 48. Wireless Region by Telnet

6.3.3. Site Survey

Operation: [Main] → [3 Wireless Setting] → [6 Site Survey]

Site survey function can support to auto-assignment wireless parameters, and attached to access point selected automatically. After user do the **site survey** the result of all access points nearby will be displayed (**Fig.49**). Then user can select the access point that user want SW5001 to be connected to by enter the number of access point (**Fig. 50**).

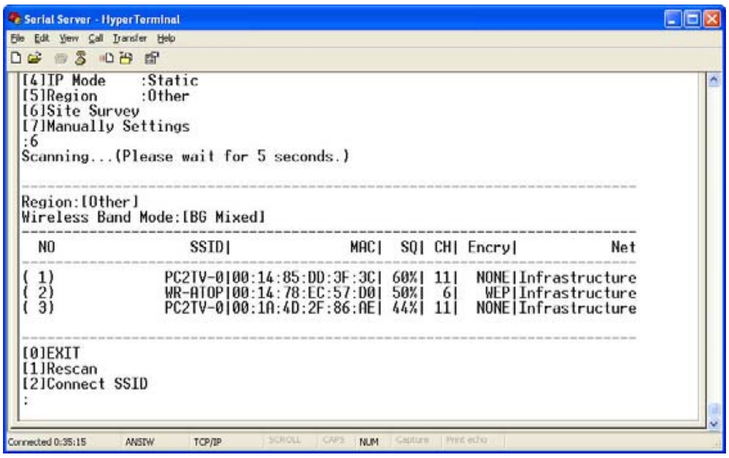


Fig 49. Wireless AP List from Site Survey

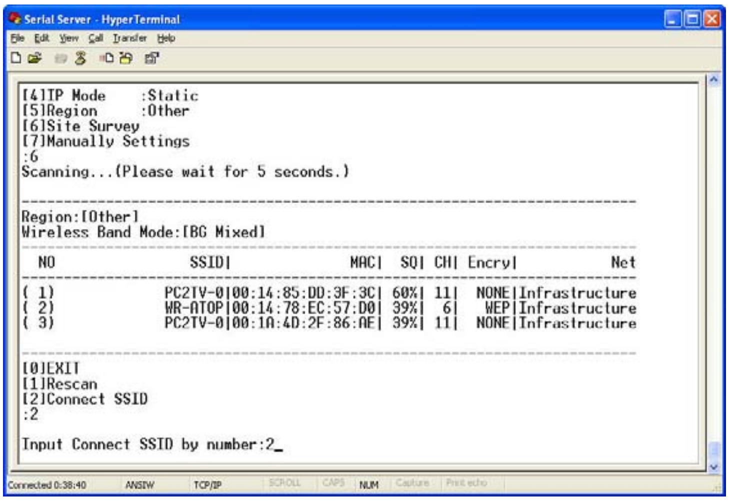


Fig 50. Connected to AP from Site list

6.3.4. Manual Wireless Settings

Operation: [Main] → [3 Wireless Setting] → [7 Manually Settings]

User can manually configure SW5001 wireless configurations by enter 7 at the Wireless Settings page. Then user can set any wireless parameters by enter the menu corresponding to that parameters. Wireless parameters are shown in **Fig. 51** below.

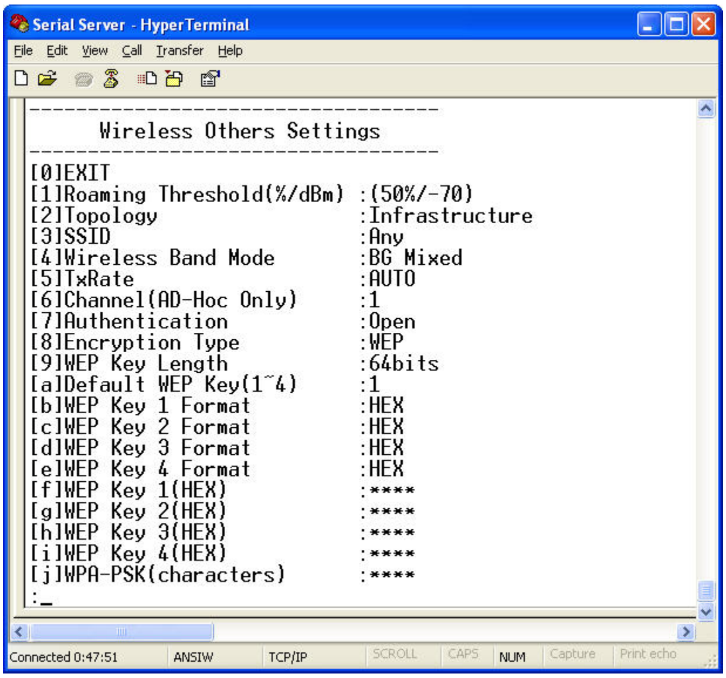


Fig 51. Configure Wireless LAN by Manual

6.3.5. Configure Ad-Hoc Mode

Operation: [Main] → [3 Wireless Setting] → [7 Manually Settings] → [2 Topology]

Independent Basic Service Set (IBSS), the most basic type of IEEE 802.11 wireless LAN, is commonly referred to as an ad-hoc network. An IBSS may consist of as few as two stations. Unlike infrastructure mode, all stations are capable of communicating directly with each other without access point.

User can configure Wireless SW5001 to be Ad-Hoc mode, by manually configure the wireless **network topology** as shown in **Fig.52** below.

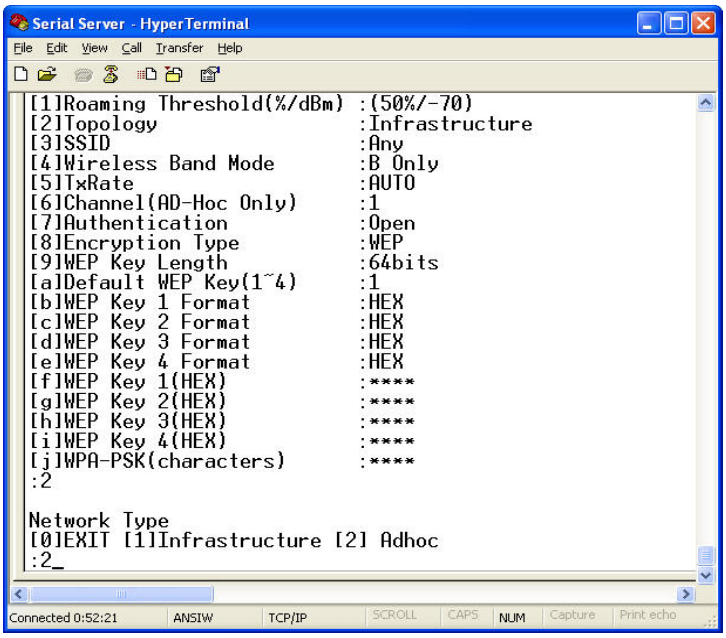


Fig 52. Configure Ad-Hoc mode by Telnet

User can select wireless link by none or WEP encryption in Ad-hoc mode and these encryptions can support applications from customer's requirements.

Configure Wireless for WEP

Operation: [Main] → [3 Wireless Setting] → [7 Manually Settings] → [8 Encryption Type]

For security reason, Wireless SW5001 can configure to use **WEP key** of **40 bits or 128 bits**, or advance **WPA-PSK** to securely communicate in the wireless network. WEP key manually configure via telnet screen is shown as **Fig. 53** below.

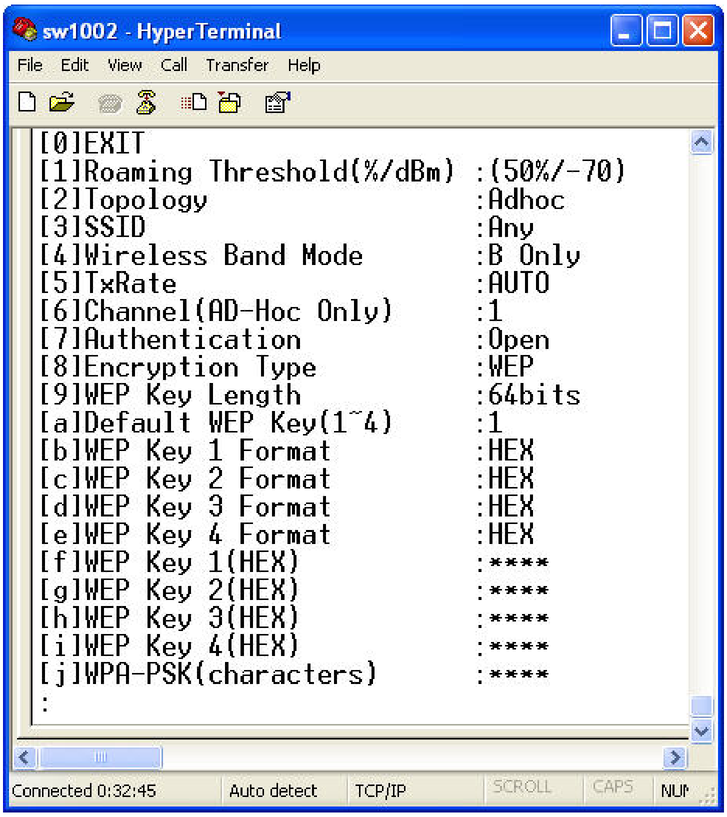


Fig 53. Configure WEP 64 bits Settings in Ad-Hoc mode with open key

※ **Note1: Enter 5 ASCII value or 10 Hexadecimal digit if select WEP64 encryption.**

※ **Note2: Enter 13 ASCII value or 26 Hexadecimal digit if select WEP128 encryption**

6.3.6. Configure Infrastructure Mode

Operation: [Main] → [3 Wireless Setting] → [7 Manually Settings] → [2 Topology]

The 802.11 infrastructure networking framework is the framework which devices communicated with each other have to connect to an Access Point (AP) first before connect to the other devices.

Wireless SW5001 supports different type of authorizations in infrastructure modes; include Open system, shared encryption with WEP64/128, WPA-PSK, from wireless encryption features.

The Figures below are some screen shot schemes for different authorized modes.

Settings with open authorization and none encryption

- **Topology:** Infrastructure
- **Channel:** Auto-assignment from Access point
- **Authentication:** open
- **Encryption:** None

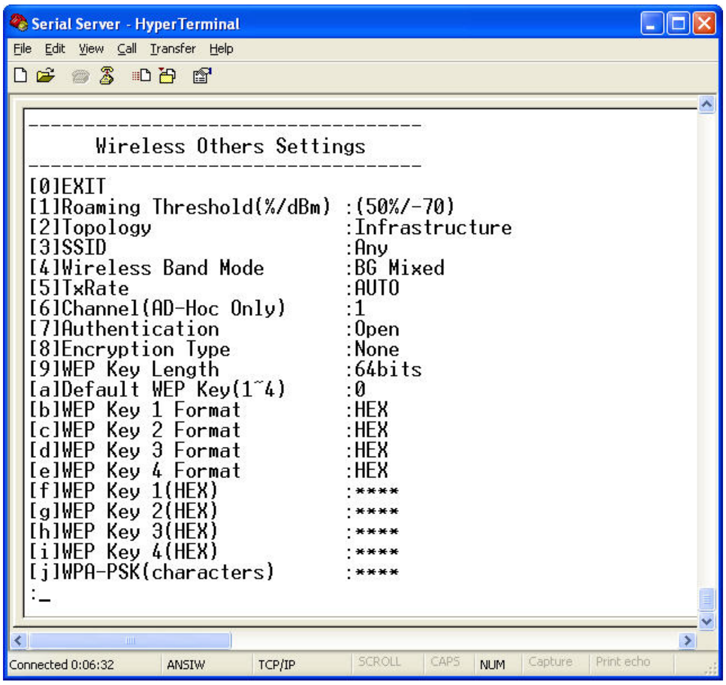


Fig 54. Wireless: Open authorization and none encryption

Configure share authorization with WEP encryption

- **Topology:** Infrastructure
- **Channel:** Auto-assignment from Access point
- **Authentication:** shared
- **Encryption:** WEP

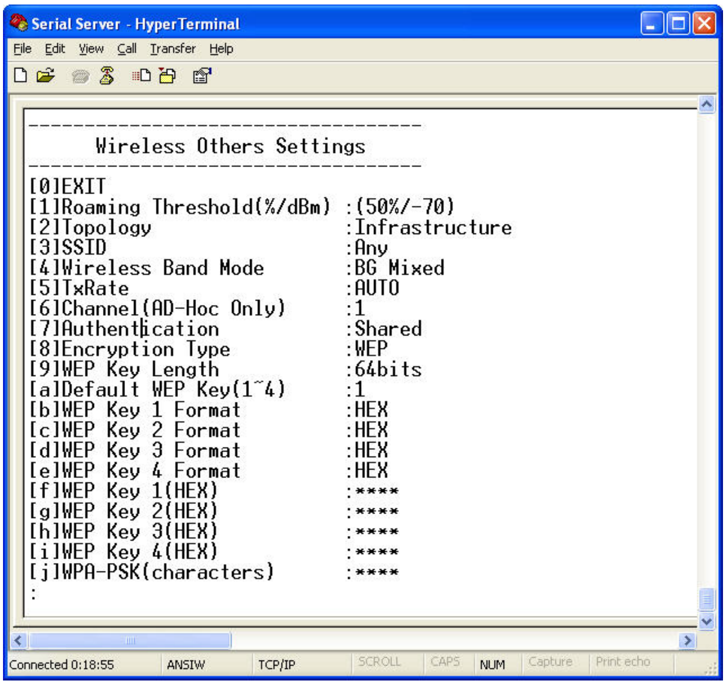


Fig 55. Wireless: Share authorization and WEP encryption

Configure wireless network via access point with WPA-PSK

- **Topology:** Infrastructure
- **Channel:** Auto-assignment from Access point
- **Authentication:** WPA-PSK
- **Encryption:** TKIP or AES
- **WPA-PSK:** 8~ 63 Characters

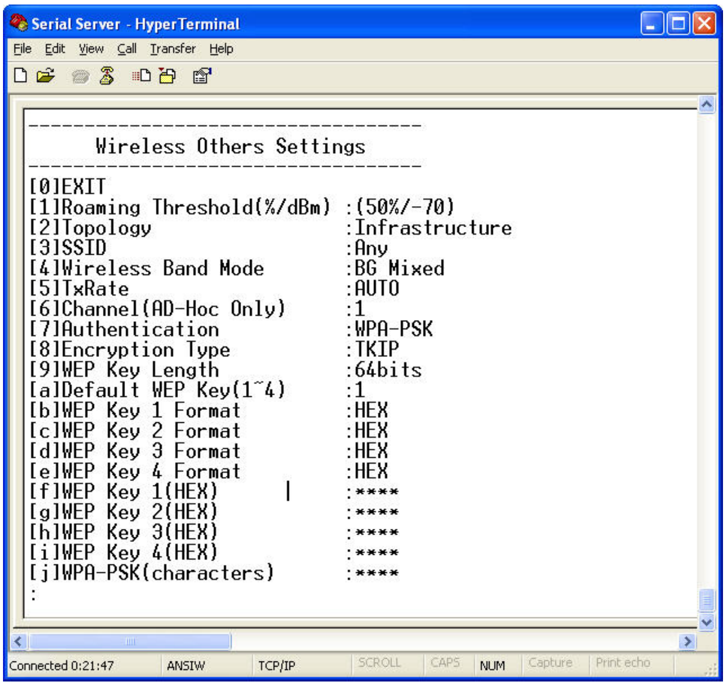


Fig 56. Wireless: WPA-PSK authorization and TKIP encryption

6.4. COM Port Configuration

User can configure serial parameters, include COM1 **operation mode**, **port parameters**, **enable or disable serial buffer**'s data and **packet delimiter**.

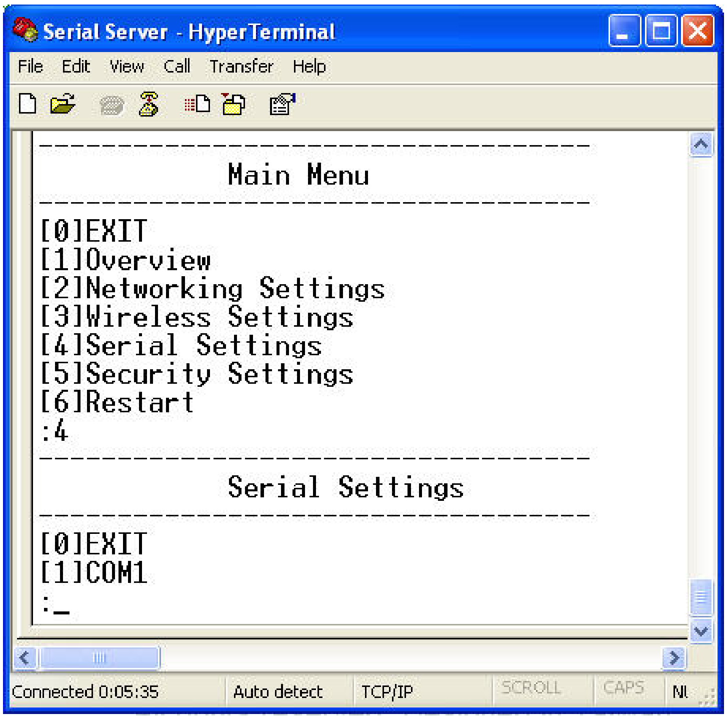


Fig 57. Select COM Port from Serial Settings by Telnet

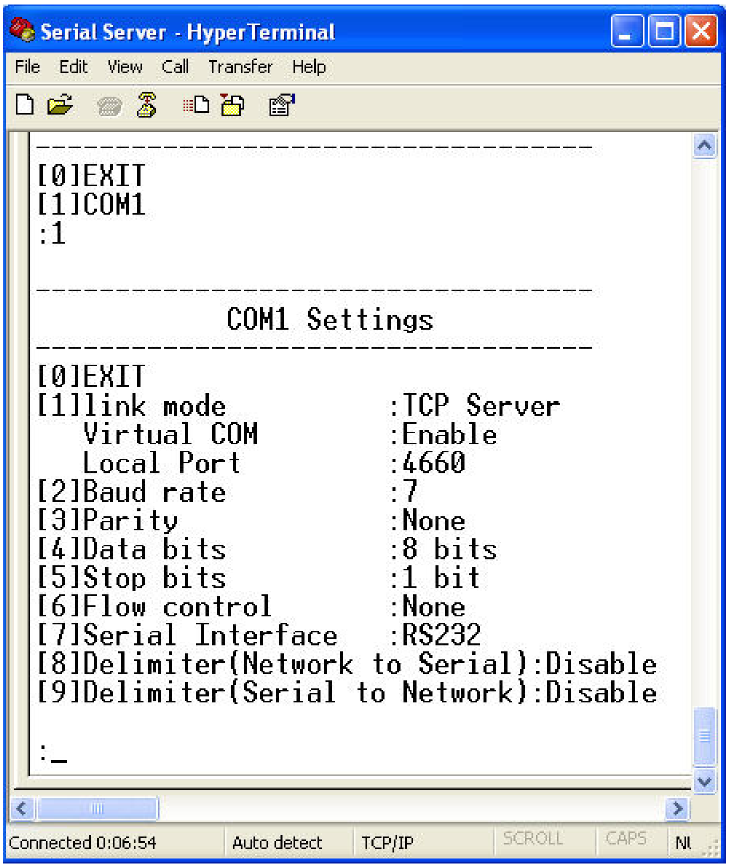


Fig 58. The COM1 Setting page

6.4.1. TCP Server Mode for Link Mode

Operation: [Main] → [4 Serial Settings] → [1 Link mode] → [1 TCP Server]

TCP Server mode is **default** setting for Link mode of serial settings of SW5001, and it can be configured to wait for the host computers to establish a connection with the serial device through SW5001. SW5001 needs to be configure the listening port to waiting for host connection, Default Port number of SW5001 is 4660 and it is associated with the serial port COM1. After the connection is established, data can flow in both directions. SW5001 can wait for connection requested from remote PC which installed **"serial-to IP"** tool or counter-pair SW5001 in **tunneling mode**. After the application program being connected to the TCP port 4660 on the SW5001, data of user application program are transmitted transparently to serial devices through SW5001 and vice versa.

User enters 1 at COM1 Settings page and enters 1 for the TCP Server mode. To enable the remote client which install "**serial-to IP**" to connect to SW5001, user has to **enable** the **Virtual COM** and Set up the designated **port** number.

IP filtering menu is a simple **ACL (Access Control List)**. It can be disabled by setting **FILTER_IP** to **"0.0.0.0"**. User can configure one or group IPs for source IP in IP filtering. If **IP filtering** is **enabled**, only **source IP** assigned can connect to SW5001.

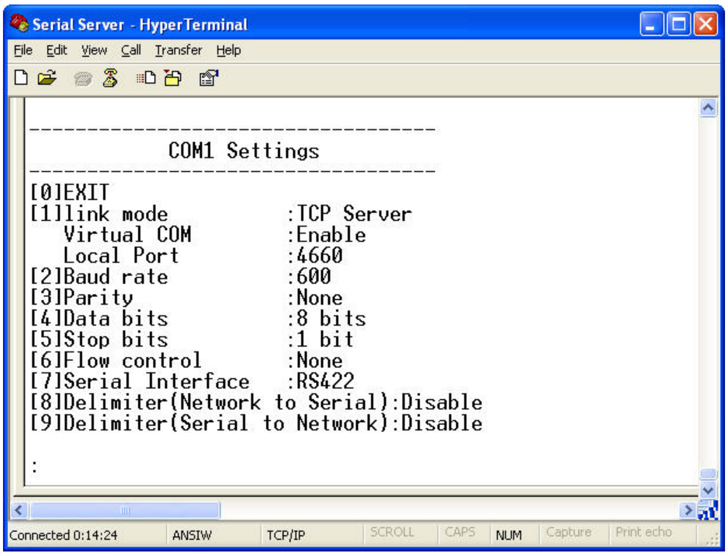


Fig 59. TCP Server mode in link mode

❈ **Note: Enable Virtual COM mode if the remote site PC's "Serial to IP" tool is installed.**

6.4.2. TCP Client for Link Mode

Operation: [Main] → [4 Serial Settings] → [1 Link mode] → [2 TCP Client]

User can configure SW5001 to work in TCP Client mode. On destination IP & port (default: COM1:4660), Enter the desired destination IP and port (Server IP and port) that SW5001 want to connect to (For example, another SW5001, or PC for data-collection). The SW5001 can support two destination host computers simultaneously. **Fig. 60** is the **TCP Client** page.

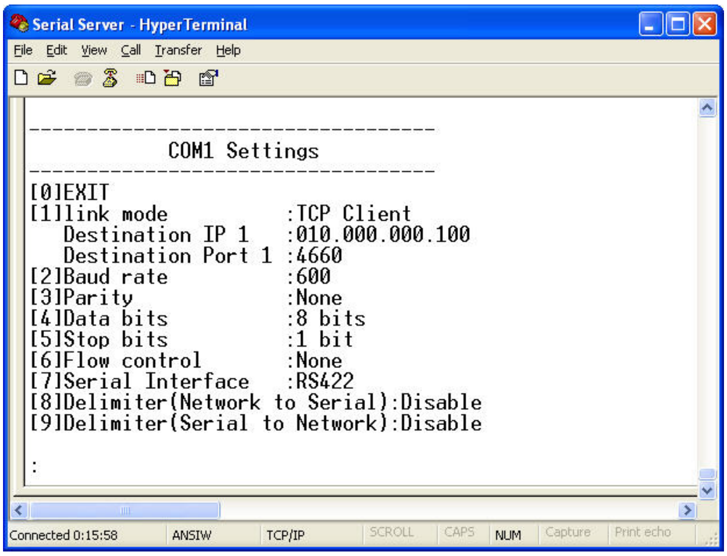


Fig 60. TCP Client mode in link mode

6.4.3. UDP for Link Mode

Operation: [Main] → [4 Serial Settings] → [1 Link mode] → [3 UDP]

SW5001 can be configured to work in UDP mode to establish connection using **Unicast** or **Multicas**t protocol. Data can be transmitted from one or multiple serial devices to/from one or multiple host PCs and vice versa. For example, the original RS-422/ RS485 bus data is transferred over the extended connected distance by SW5001s, The destination IP is assigned by single IP or group IPs, The configuration is limited by the Local Listening Port, default 4660 on the COM1 port of SW5001.

SW5001 can support up to 4-group IPs for UDP connection, if users needed.

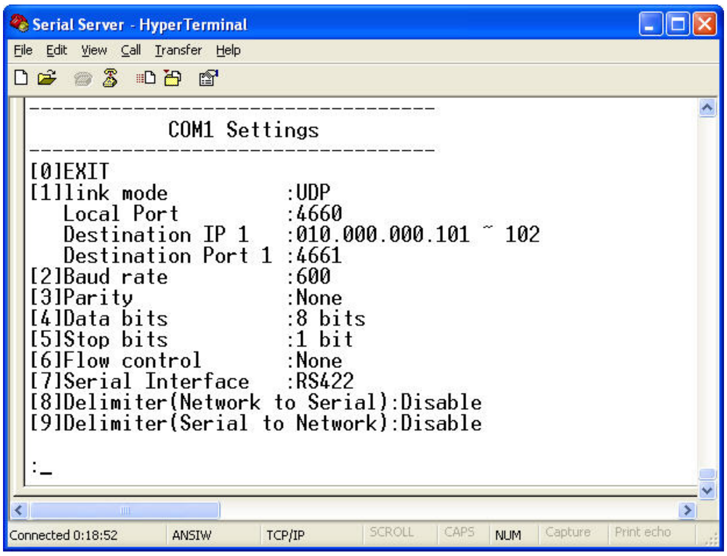


Fig 61. UDP mode in link mode

❈ **Note: In this phase, UDP mode does not support Virtual COM mode.**

6.4.4. Serial Settings

Operation:

[Main] → [4 Serial Settings] → [2 Baud rate]/ [3 Parity]/[4 Data bits]/ [5 Stop bits]/ [6 Flow control]

User can configure **baud rate**、**data bits**, **parity**、**stop bit** and type of **flow control.**

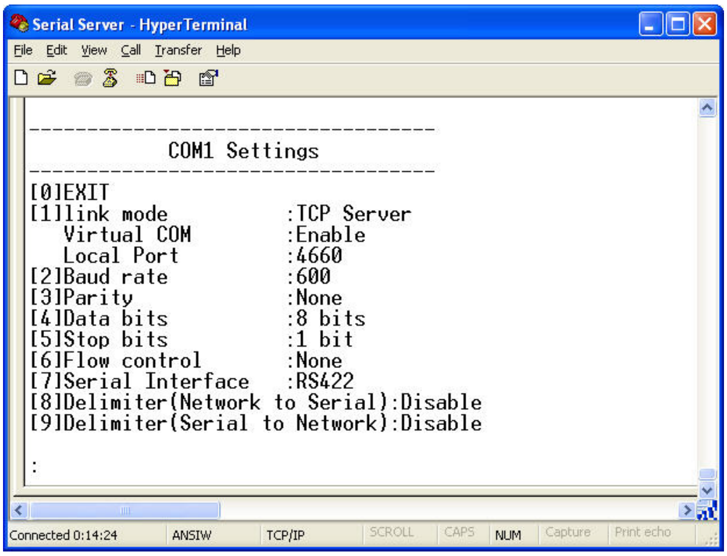


Fig 62. Serial Settings by Telnet

❈ **Note: The isolation one, SW5001-WgN1Sis (TB), only supported max 230Kbps baud rate.**

6.4.5. Packet Delimiter

[Main] → [4 Serial Settings] → [8 Delimiter (Network to Serial)]/ [9 Delimiter (Serial to Network)]

Packet delimiter is a way of controlling the number of packets in a serial communication. It is designed to keep packets in track. SW5001 provides two ways in packet delimiter parameter setting: (1) Packet delimiter **by timer** and (2) Packet delimiter **by character**. By **default, packet delimiter timer is 10 ms**. The ranges of packet delimiter timer is 10 to 30,000 ms, If "character pattern' is selected, for a data stream ended with "**0x0d0a**", then the entire data buffer of the serial device is transmitted.

User can change packet delimiter timer by following the steps below.

Configure Network Delimiter using Timer

[Main]→[4 Serial Settings]→ [8 Delimiter (Network to Serial)]/ [9 Delimiter (Serial to Network)] →[1 Timer]

User can choose **packet delimiter timer**'s value as the packet delimiter indicated in **Fig. 63** below

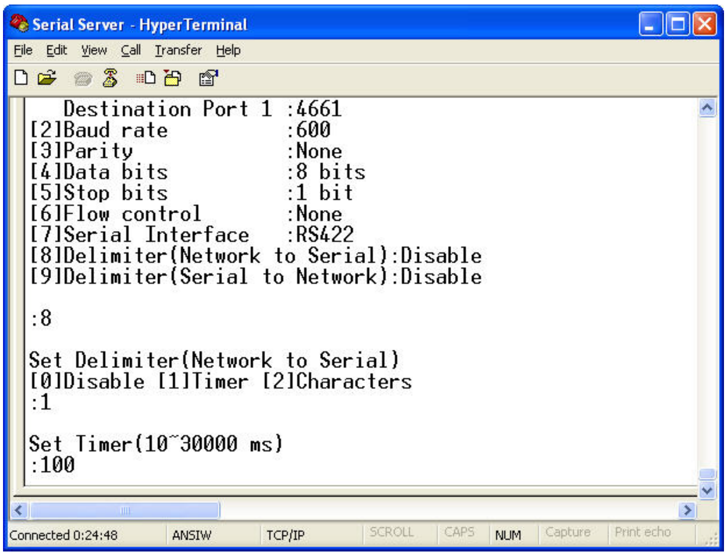


Fig 63. Configure Network Delimiter using Timer

Configure Network Delimiter using Characters

[Main]→[4 Serial Settings]→ [8 Delimiter (Network to Serial)]/ [9 Delimiter(Serial to Network)] →[2 Characters]

User can choose **packet delimiter character** pattern as the packet delimiter indicated in the **Fig. 64** below:

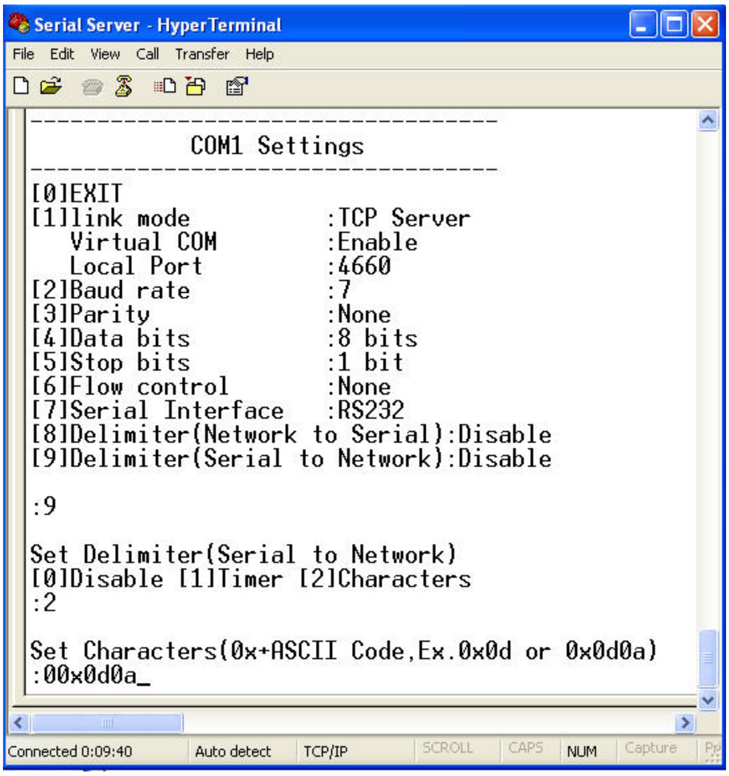


Fig 64. Configure Network Delimiter using Characters

6.5. Security Configuration

Operation: [Main] → [5 Security]

User can change password of SW5001 with this menu.

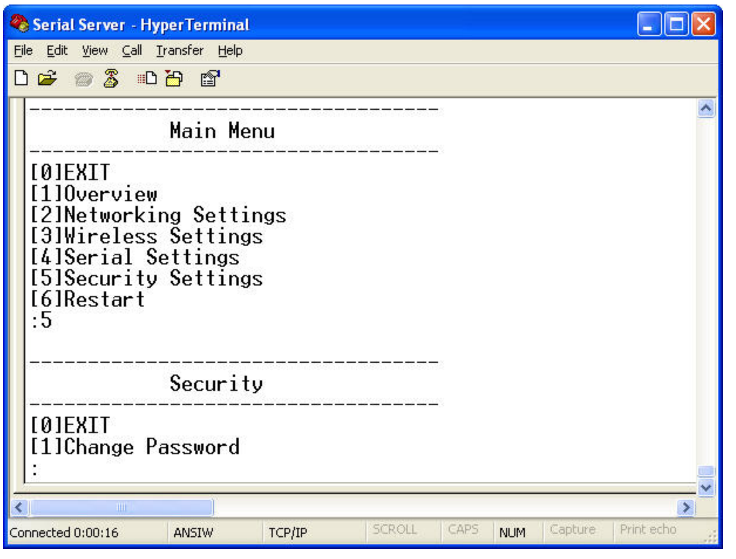


Fig 65. Security settings by Telnet

6.5.1. Change the Password

Operation: [Main] → [5 Security]→ [1 Change Password]

Enter desired password on "**New password**" fields.

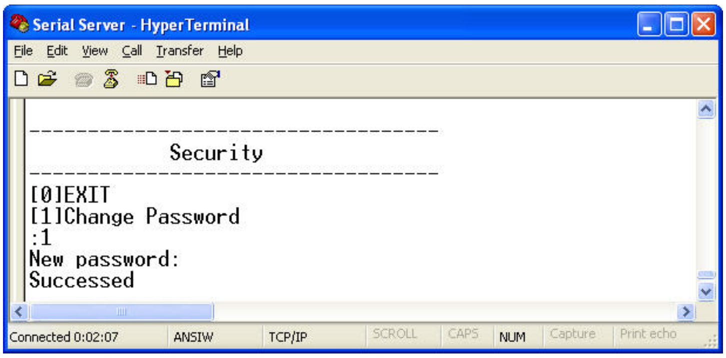


Fig 66. Changing the Password by Telnet

❈ **Note: User may press the reset key on the product to reset to default password(blank).**

Using Virtual COM

Virtual COM driver mode for windows converts COM port data (RS232) to IP data to control the RS-232C port on a SW5001 over the IP network. By creating Virtual COM ports on the PC, Virtual COM redirects the communications from the Virtual COM ports to an IP address and port number on a SW5001 which connected to the serial devices. The following figure is Virtual COM connection diagram.

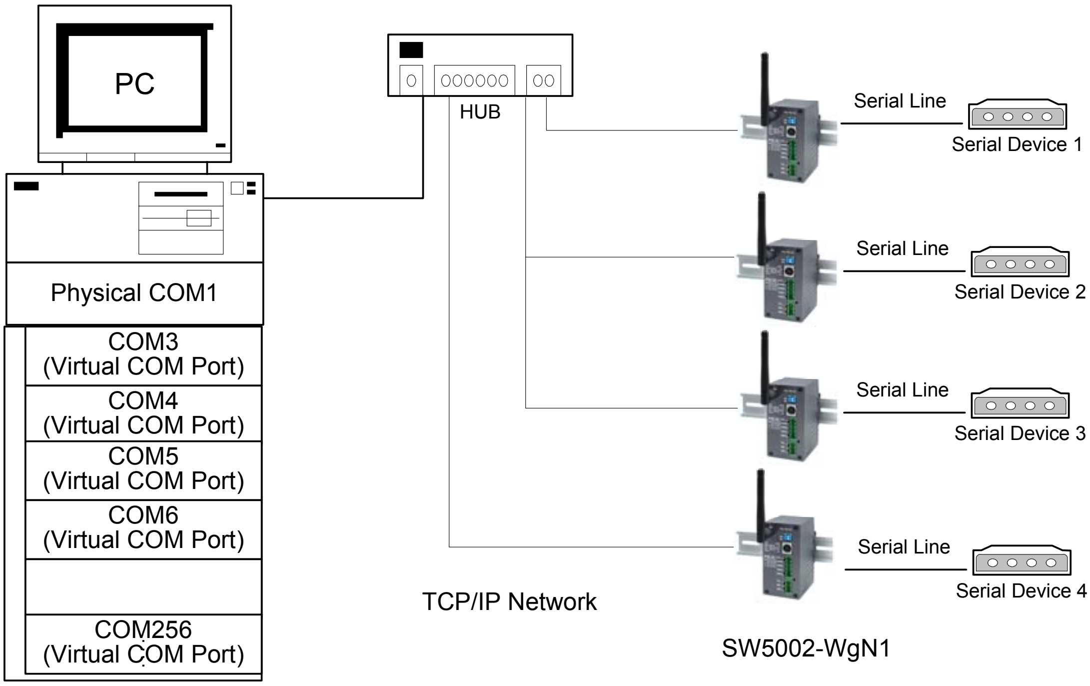


Fig 67. Setup of a Virtual COM driver

A.1. Pre-installation Requirements

Please check the operating system on your PC complied with the following requirements:

- Processor: Intel-compatible, Pentium class
- Operation system: Windows Server 2003, Windows XP, Windows 2000, Windows NT 4.0 SP5 or later, Windows Me, Windows 98, Windows 95, Microsoft NT/2000 Terminal Server, Citrix Meta Frame
- Windows Installer 2.0
- Network: Microsoft TCP/IP networking software

A.2. Applying to the SW5001

Limitation

Virtual COM driver provides user to select up to **256 COM ports** as Virtual COM ports in a monitoring PC. User can select them from a list of COM ports, which is from COM1 up to COM256.

Installation

Make sure you have turned off all anti-virus software before beginning the installation. Run Vcom.exe program included in the CD to install Virtual COM for your operating system.

In the end of the installation, please select one or two COM ports to become the Virtual COM ports.

Uninstalling

- From Windows Start menu, select Setting\ Control Panel\ Add/Remove Programs.
- Select Serial IP for in the list of installed software.
- Click the Add/Remove button to remove the program, or From Windows Start menu select Programs, Serial IP click Uninstall Serial IP to remove the program.

A.3. Virtual COM Communication

Enable Virtual COM on SW5001 by web interface

From web browser access to SW5001 by typing its IP address, click on "***Serial***" link to access Serial page, on the top half of the page click on "***TCP Server***" and enable Virtual COM by putting a check in front of the "**Enable**" checkbox, then type in the local port number in the "***Local Port***" field as indicated in the following screen.

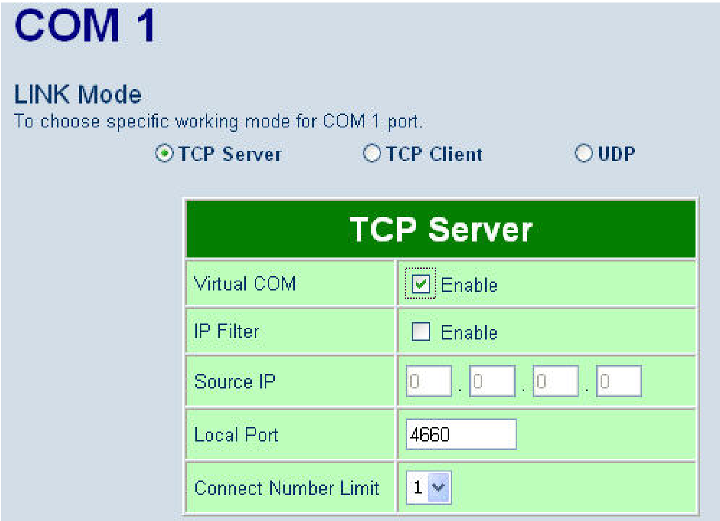


Fig 68. Enable Virtual COM Mode by Web page

Enable Virtual COM on SW5001 by Telnet

User may also enable Virtual COM through telnet by setting Serial as a TCP server, and enter the local port number for Serial, then enable virtual COM as shown in the following procedure:

Login SW5001 via Telnet

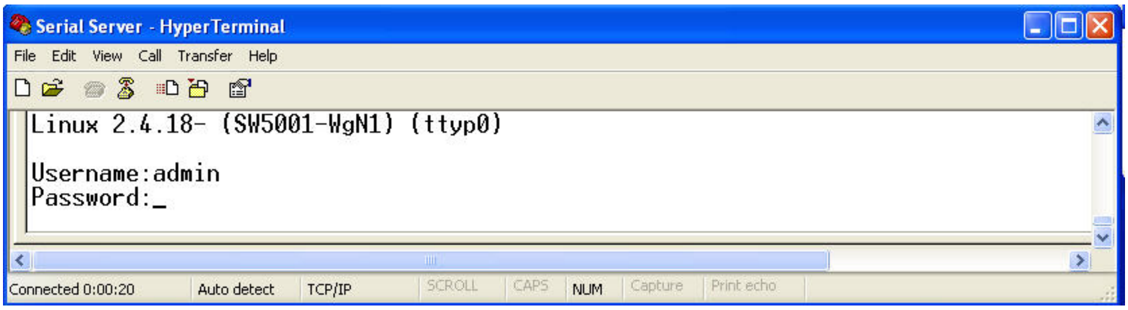


Fig 69. Login into SW5001 by Telnet or Console

Select **serial setting** for TCP server/Client, and enabling Virtual COM mode

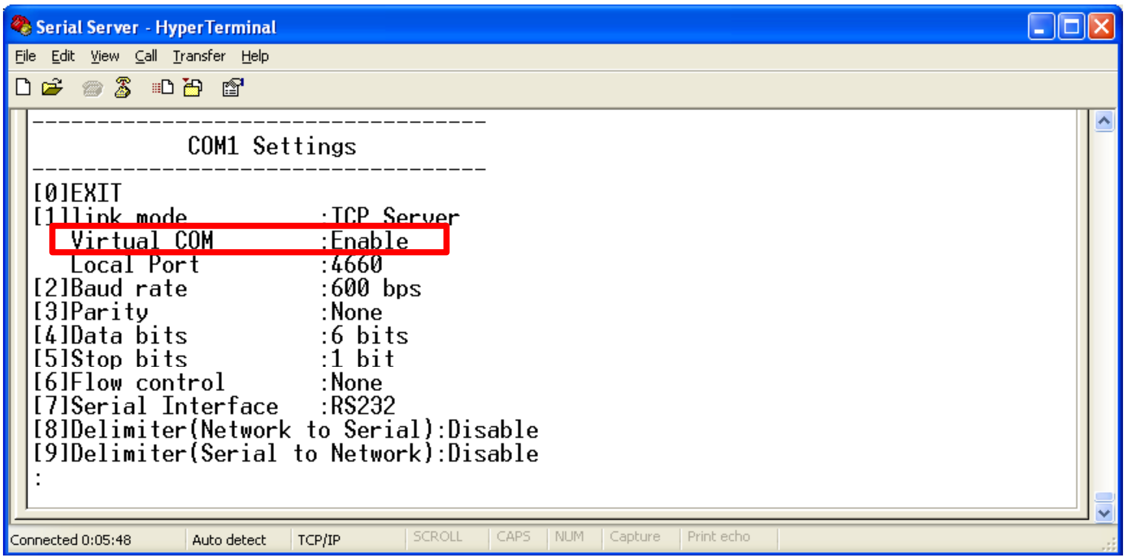


Fig 70. Enable Virtual COM mode by Telnet

Running Serial to IP for program on monitoring PC

On Window Start Menu, **go to\program\Serial/IP\Control panel**, The "Serial to IP for Control Panel" window shall appear. Then select the serial port.

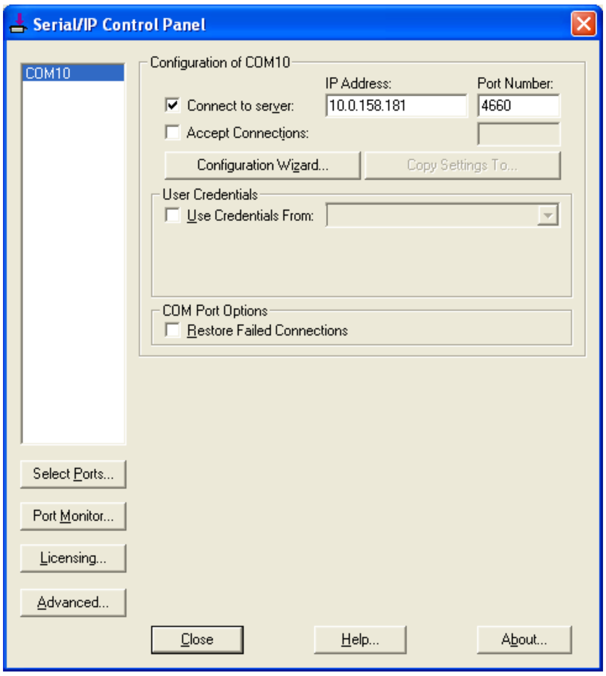


Fig 71. Detail setting from Serial/IP

On the right of the panel is a sample for COM 4 settings. On the left is the list of the COM ports that have been selected (on **Select Ports** window) for use by the Virtual COM Redirector. Change the list by clicking the **Select Ports** button.

Each COM port has its own settings. When click on a COM port, the Control Panel changes to reflect that the selected port.

❈ **Note: COM port changes become effective immediately.**

Configure Virtual COM Ports

Serial/IP COM port can be changed as follows:

- Select a COM port on the list.
- On **IP Address of Server**, enter SW5001 IP address.
- On **Port Number**, enter the TCP port number of the SW5001.
- On **Server Credentials**, the default is **No Login Required**. If the SW5001 does require login by the Virtual COM Redirector, the Virtual COM Redirector must provide a username and/or password every time an application tries to access the SW5001.
- Click the **Configuration Wizard** button and then click the **Start** button that shall appear on the wizard window. This step verifies that the Virtual COM Redirector communicates with the SW5001. If **Log** display does not show errors, click **Use Settings**, return to the Control Panel
- Settings on the **Connection Protocol** must match the TCP/IP protocol supported by the SW5001. The Configuration Wizard is capable of determining the correct settings.
- On **COM Port Options**, the settings must match the COM port behavior expected by the PC application. The Configuration Wizard will recommend such settings.

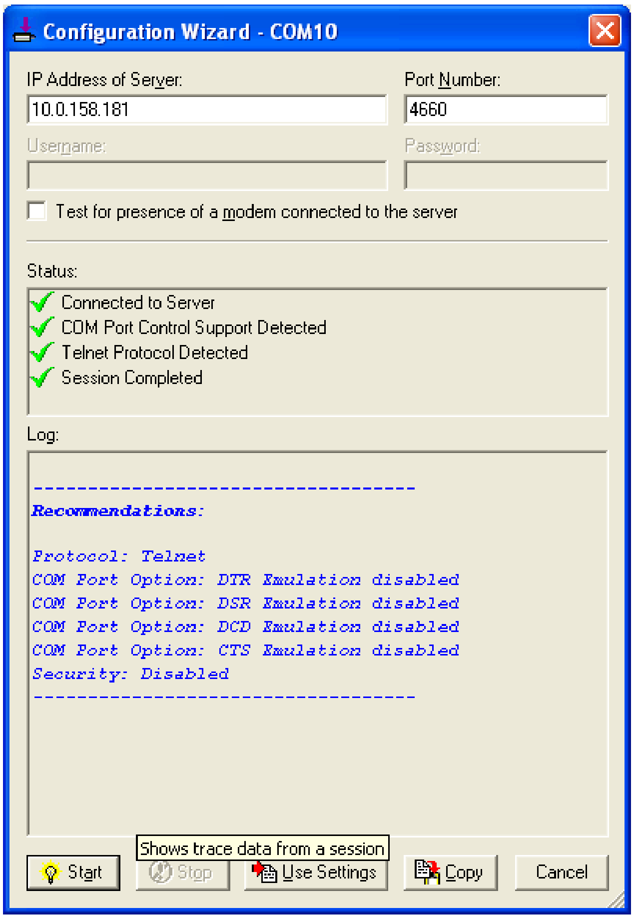


Fig 72. Configuration Wizard from Serial to IP tool

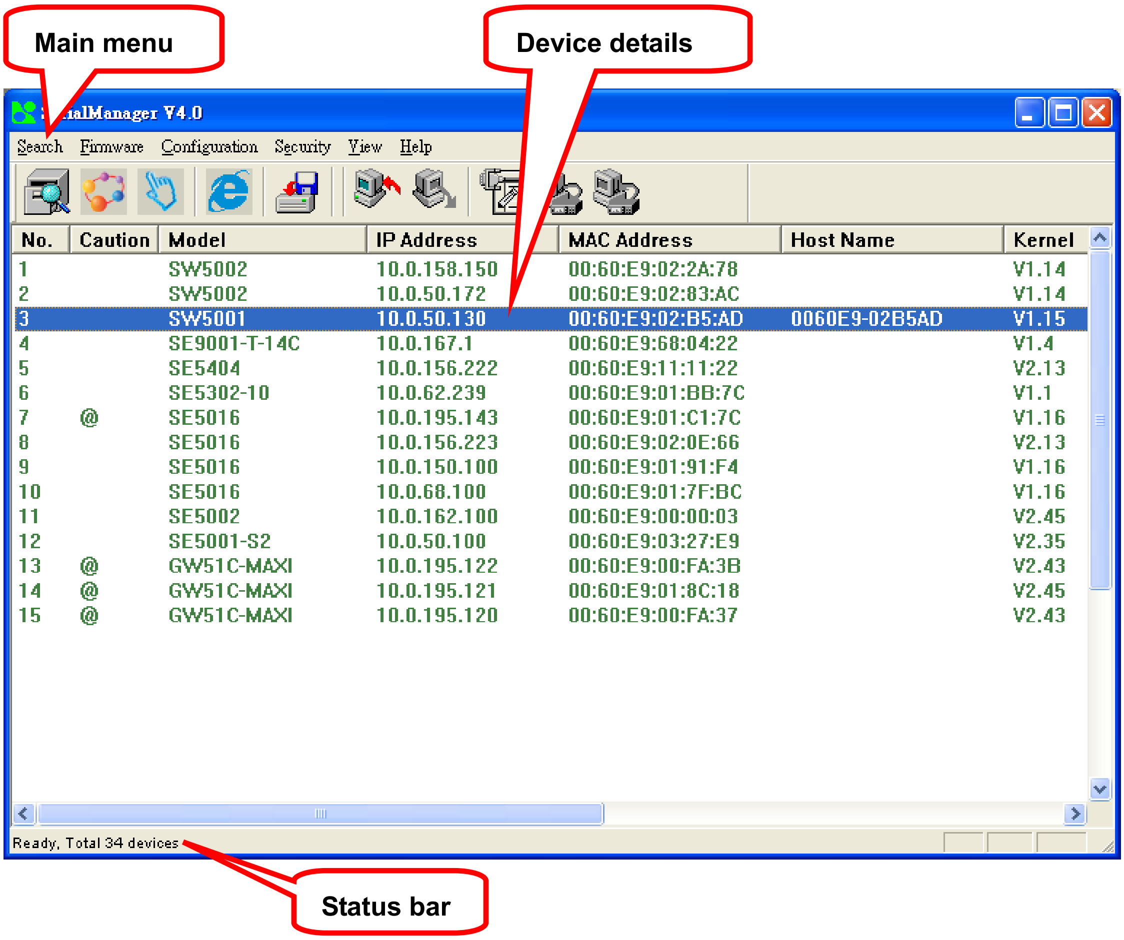
Appendix B. Configuration Utility

B.1. SerialManager Utility Introduction

SerialManager Utility, developed by ATOP, is a special tool for device management and configuration, and can realize the daily management on various ATOP network devices for address search, device positioning, parameter configuring, firmware downloading and so on.

B.2. Interface

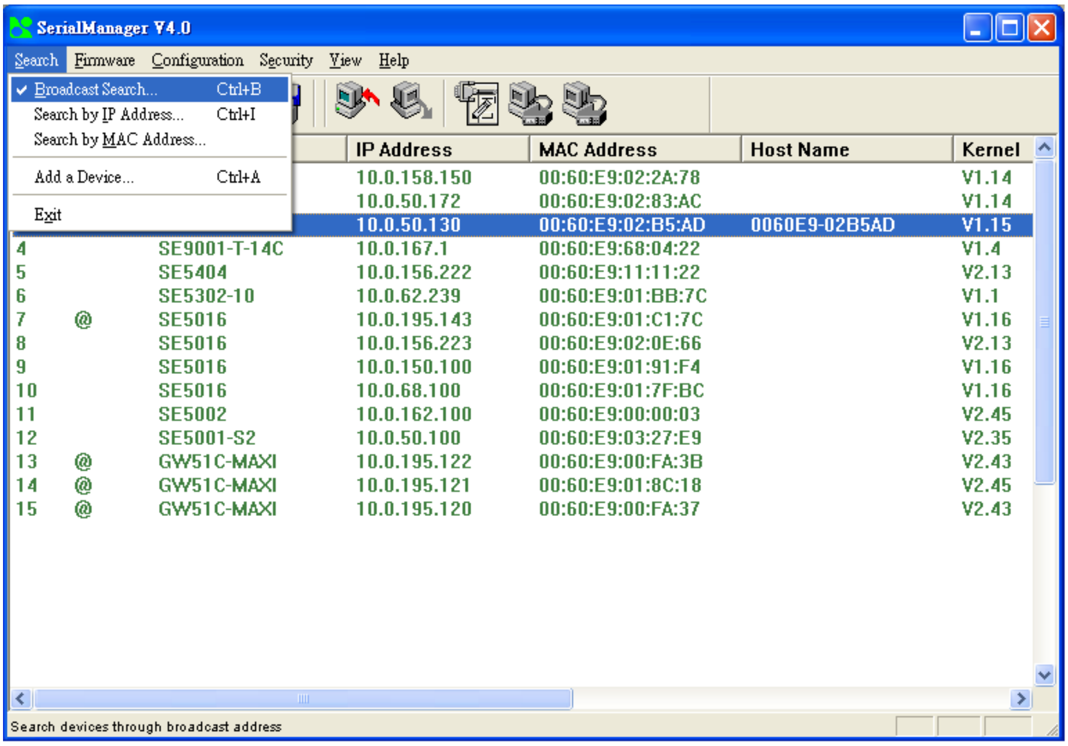
The operating interface of the **SerialManager Utility** shown as below:



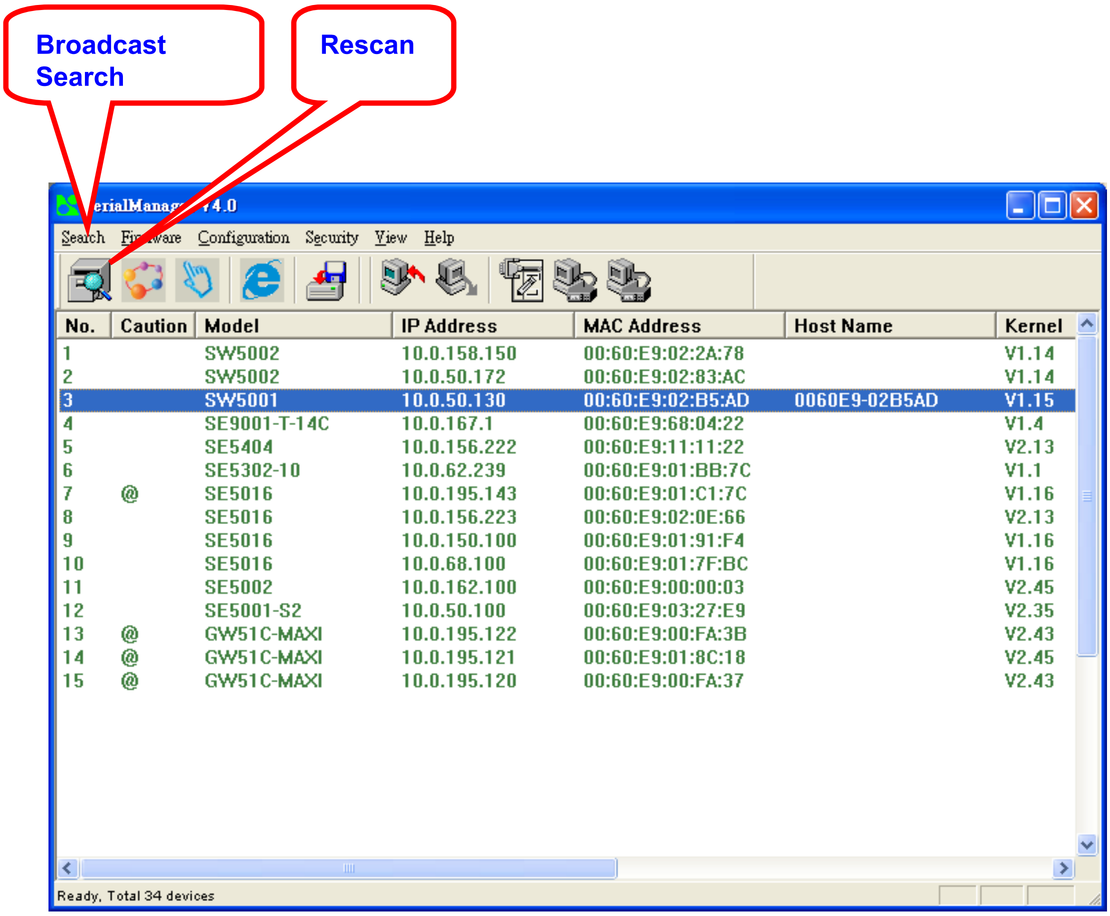
B.3. Functions

B3.1 Device Search

This function is applied to search devices in the network. The user can use four ways to search devices. They are search by broadcast, search by special IP addresses, search by special MAC addresses and rescanning devices by using the current search way. The user can select his required search way by clicking the **Search** option on the main menu, shown as below:



Or, select by clicking a button on the toolbar, as below:



B3.1.1 Broadcast Search

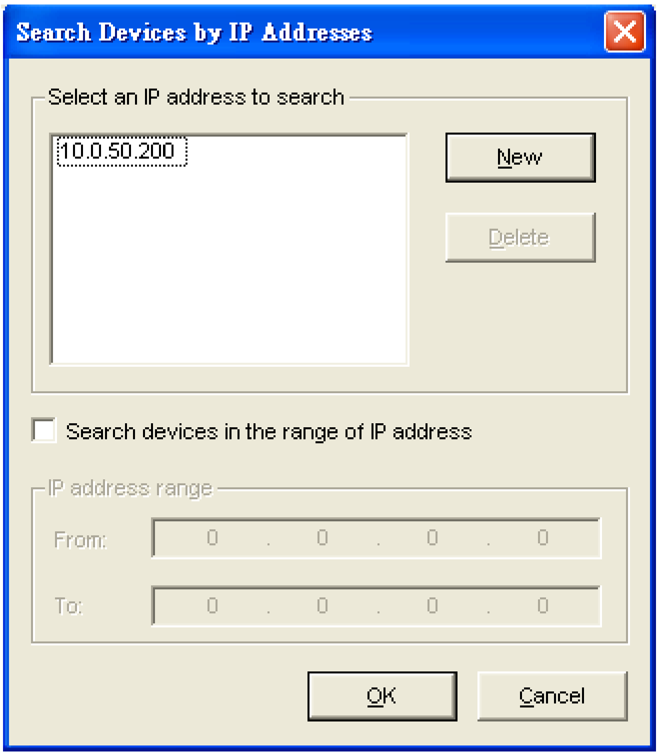
Once **Broadcast Search** is selected, a box will pop up as below:



The user may type in or select different broadcast address based on his/her own requirement.

B3.1.2 Search by IP address

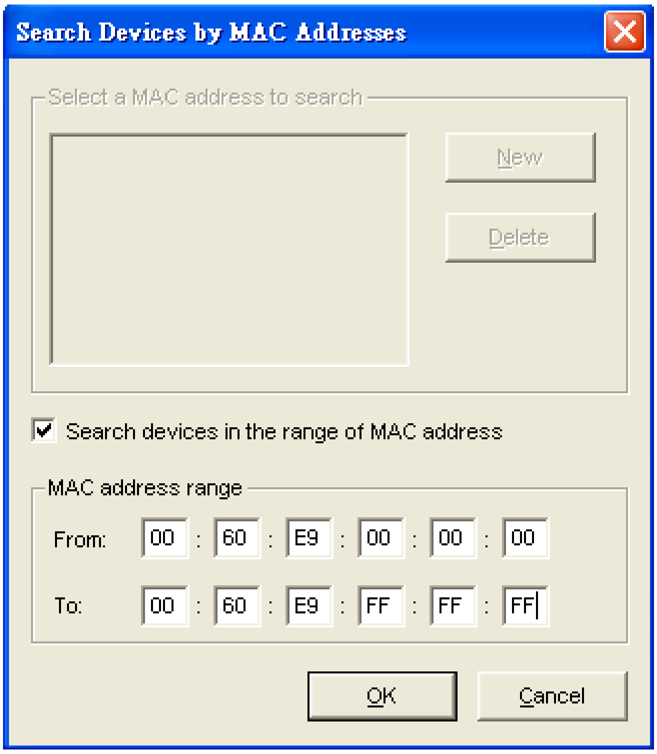
Once **Search by IP Address** is selected, an interface will pop up as below:



Here user may have two options: **Select an IP address to search** or **Search device in the range of IP address**.

B3.1.3 Search by MAC Address

If **Search by MAC Address** is selected, another box will pop up as below:



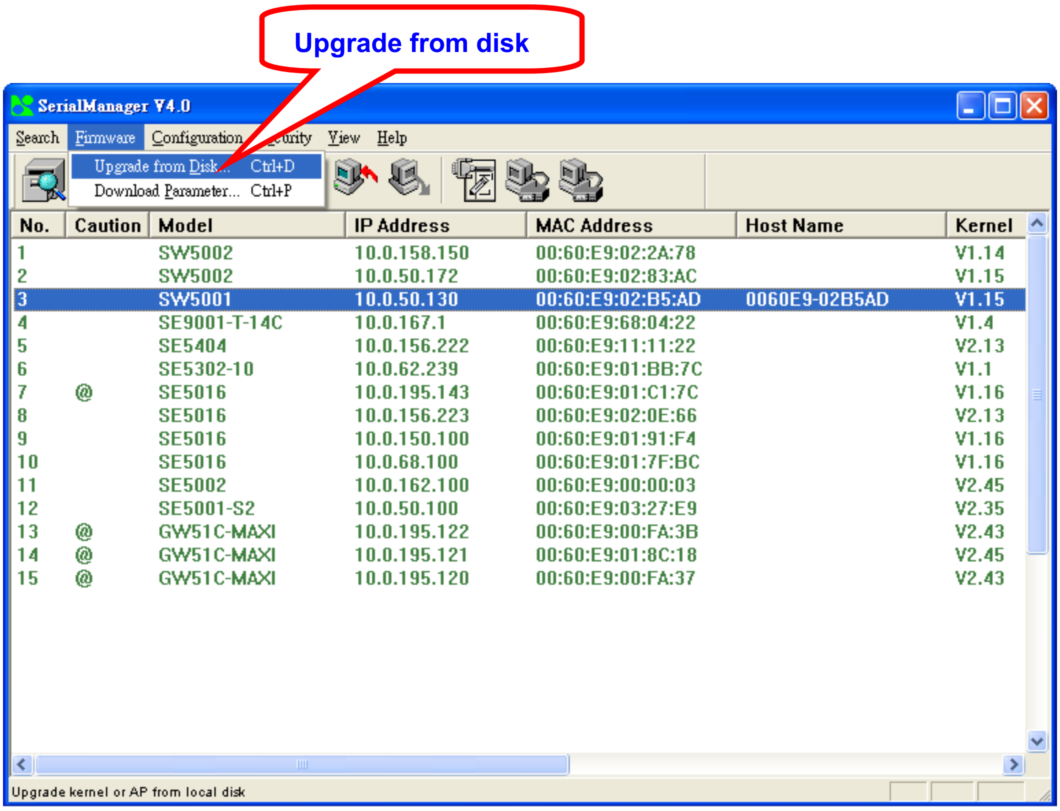
Here the user may search in two ways: **Search a MAC address to search** or **Search devices in the range of MAC address**

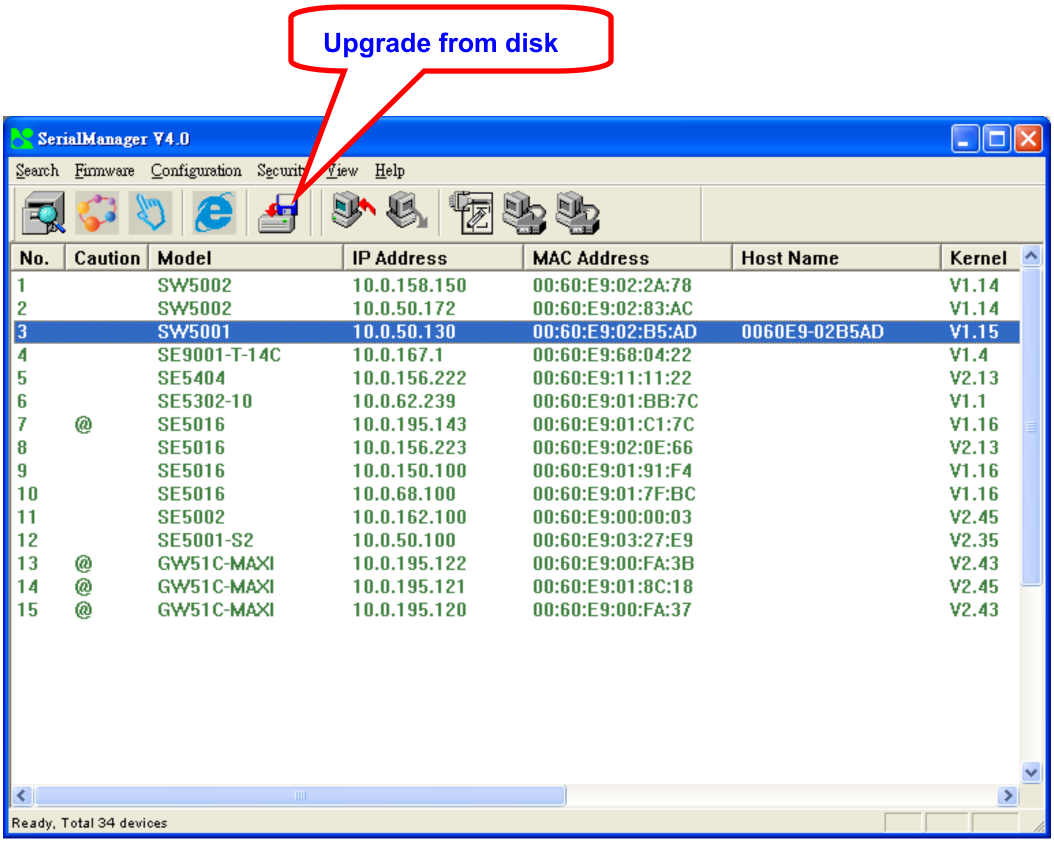
B3.1.4 Rescan

Once the user click the **Rescan** button on the toolbar, the SerialManager Utility shall re-search devices by using the current search way.

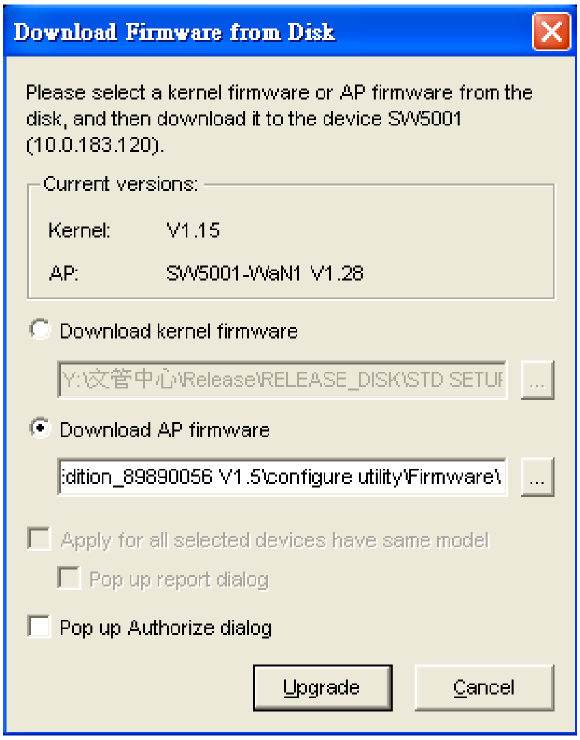
B3.2 Firmware

This function is applied to downloading a firmware into a selected device.

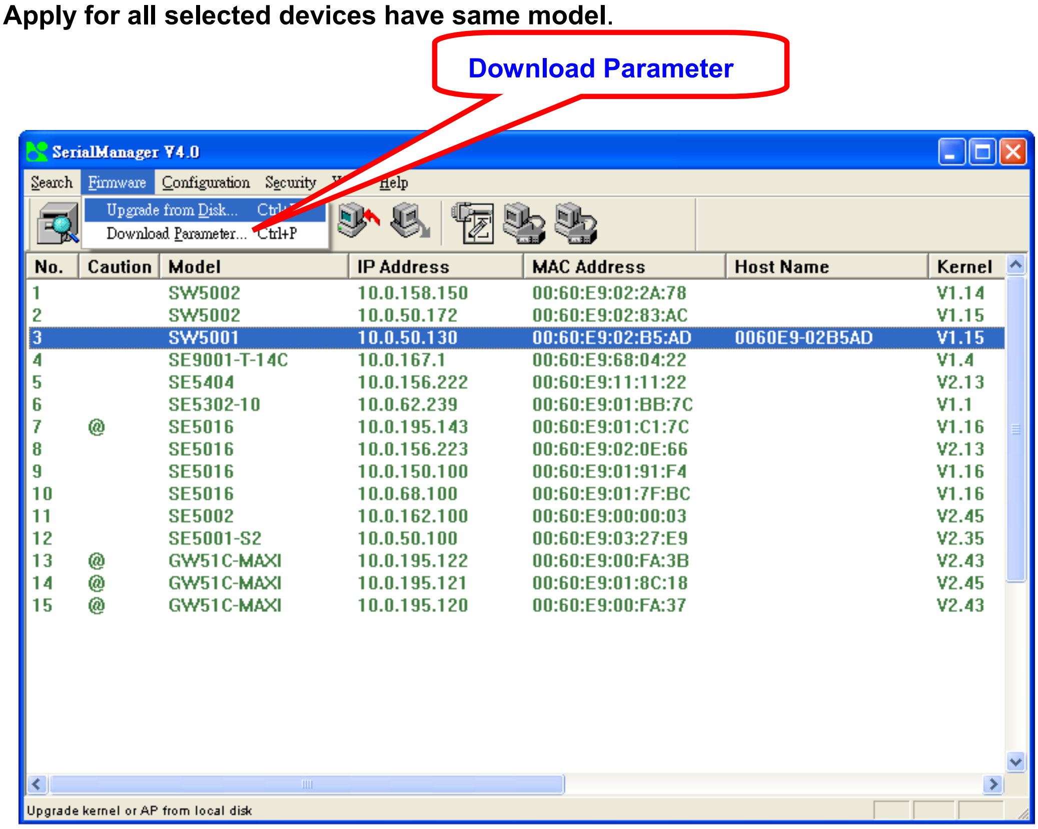




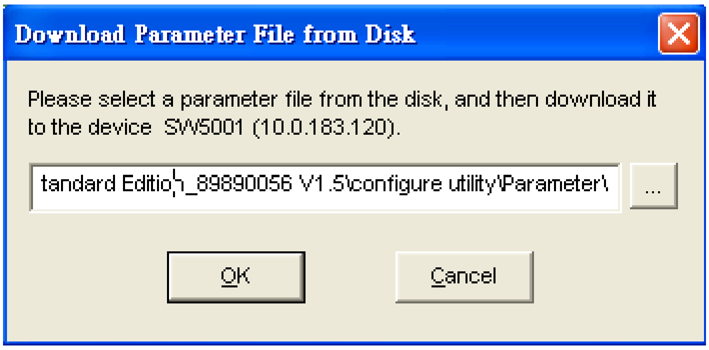
The user can enter the window for downloading by firstly clicking a designated network device, and then selecting the submenu option **Upgrade from disk** in the main menu option **Firmware**, or directly clicking the button **Upgrade from disk**. And then the user can select and download the required firmware from the disk, as shown in the figure below:



The user can also select several same devices at one time, and realize the firmware updating for them by selecting **Apply for all selected devices have same model**.



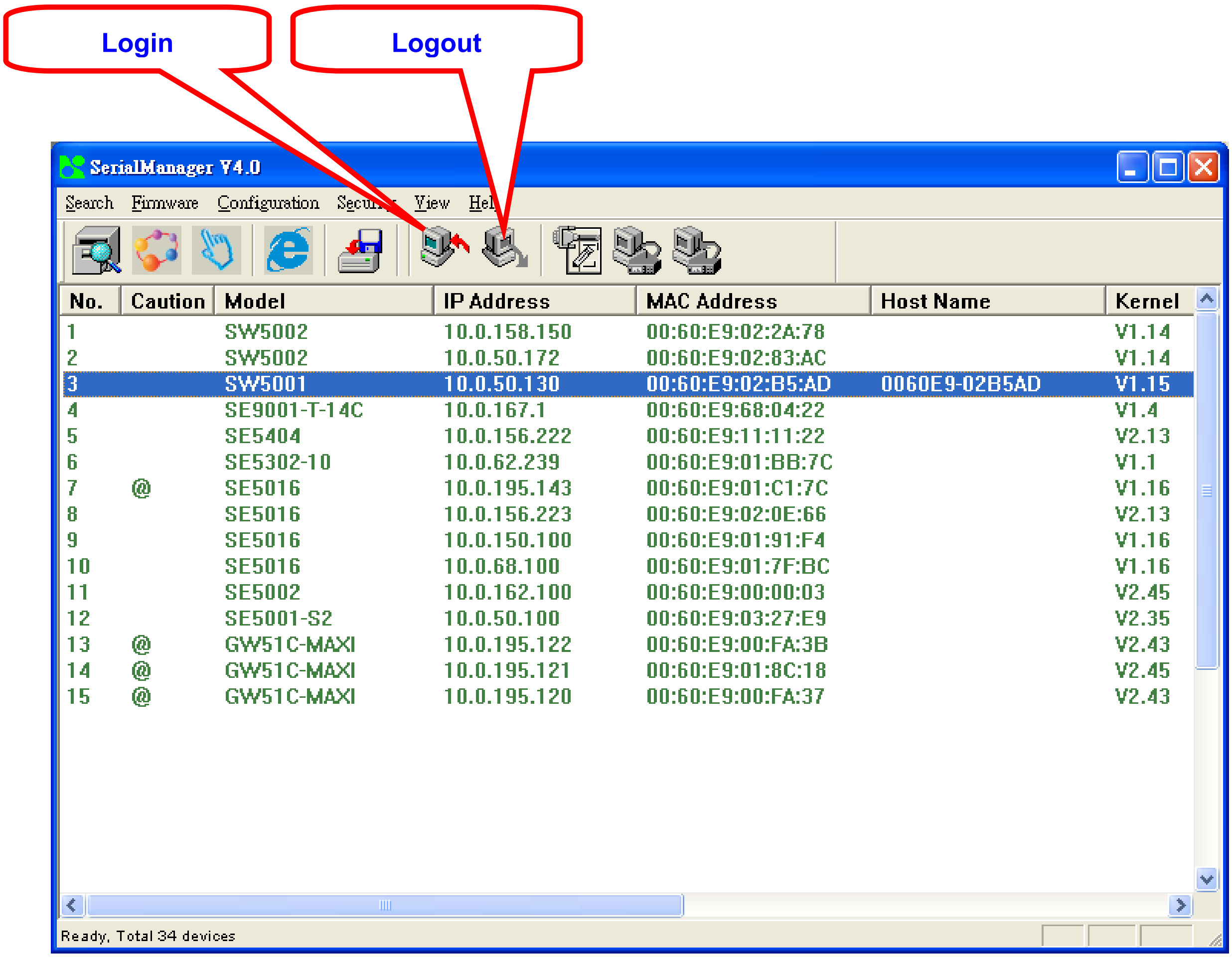
In addition for some devices with JFFS2 file system supported, the user can download the related parameter data into the device that supports the JFFS2 file system through a submenu **Download Parameter**. See details as the figure below:



Note: Some of old firmware version did not support SerialManual firmware upgrade function. Please refer to appendix "Upgrading System Software "for detail.

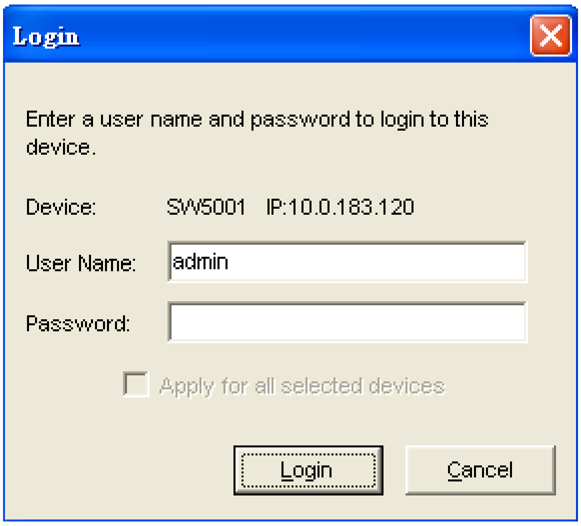
B3.3 Security

This function is applied to the security protection for the network devices, so as to supply some necessary protection to a device for configuration modifying, configuration leading-in and leading-out, and some other important functions. Here three functions are mainly supplied, including: **Login**, **Logout** and **Change Password**, shown as the figure below:



B3.3.1 Login

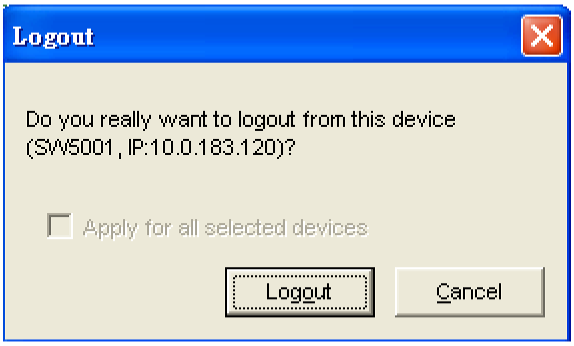
This function is applied to the login to any network device, as some important devices can only be operated after a successful login, shown as the figure below:



The user can also select several devices at one time, and log in them at the same time by selecting **Apply for all selected devices**.

B3.3.2 Logout

This function is applied to the logout from any network device, as the user should always carry out a logout after he/she has finished the operating action to any important device, shown as the figure below:



The user can also select several devices at one time, and log out them at the same time by selecting **Apply for all selected devices**.

B3.3.3 Change Password

This function is applied to modifying the password for logging in any network device, but can only be realized after a successful log-in, shown as the figure below:

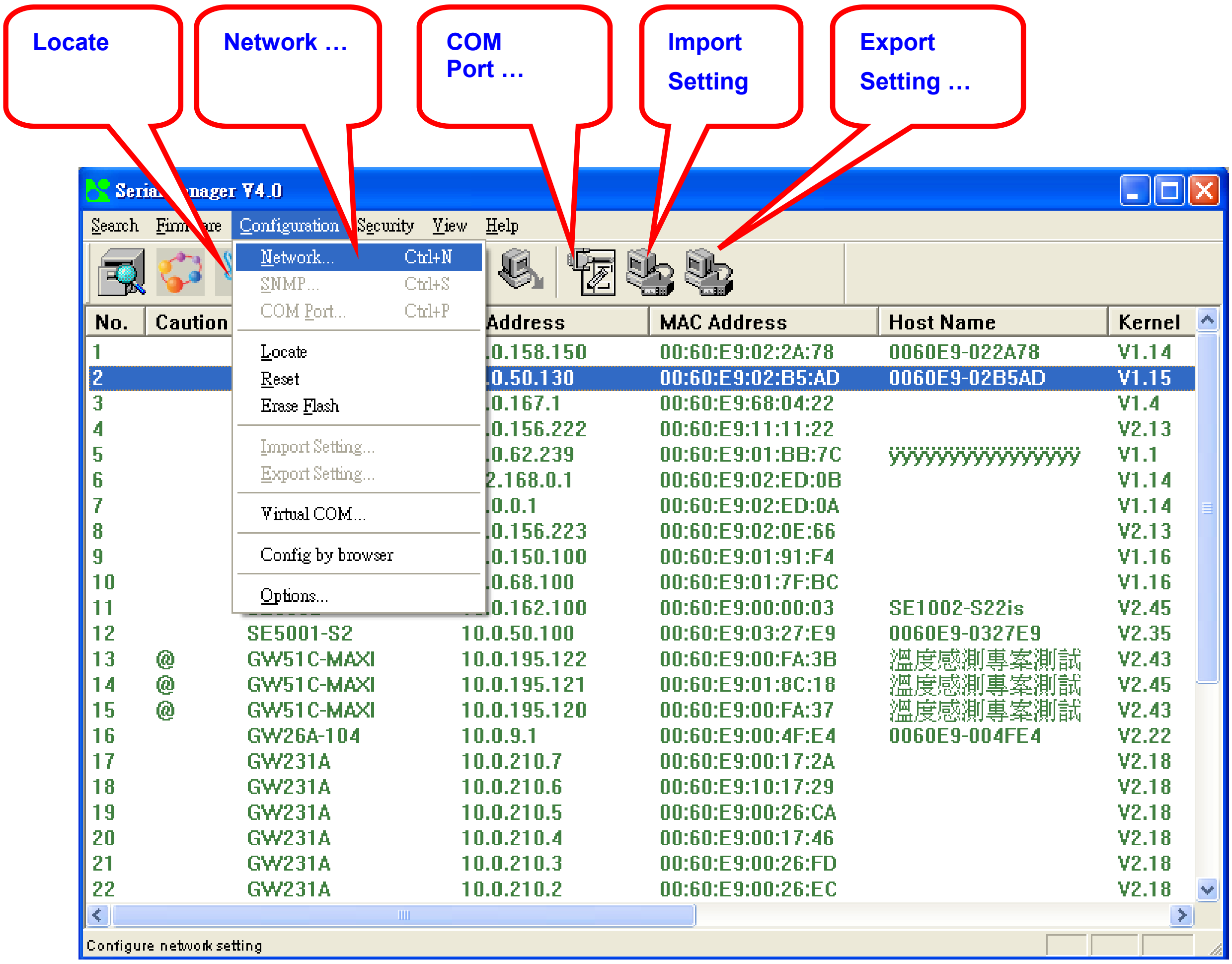


The user can also select several devices at one time, and modify their pins at the same time by selecting **Apply for all selected devices**.

B3.4 Configuration

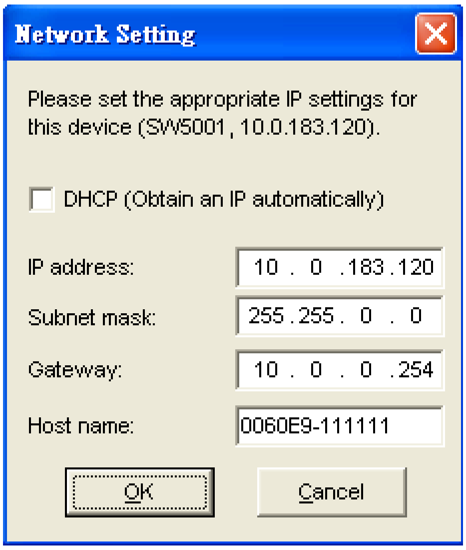
This function is applied to the configuring, import and export of work parameters for any network device, and here are mainly supplied with: 'Network …', 'COM Port…', 'Locate', 'Reset', 'Erase Flash', 'Import Setting…', 'Export Setting…', 'Virtual COM…', 'Config by IE' and 'Options', and some other application functions. The user can carry out a configuration operating through

menu or by clicking the corresponded button on the toolbar, shown as the figure below:



B3.4.1 Network …

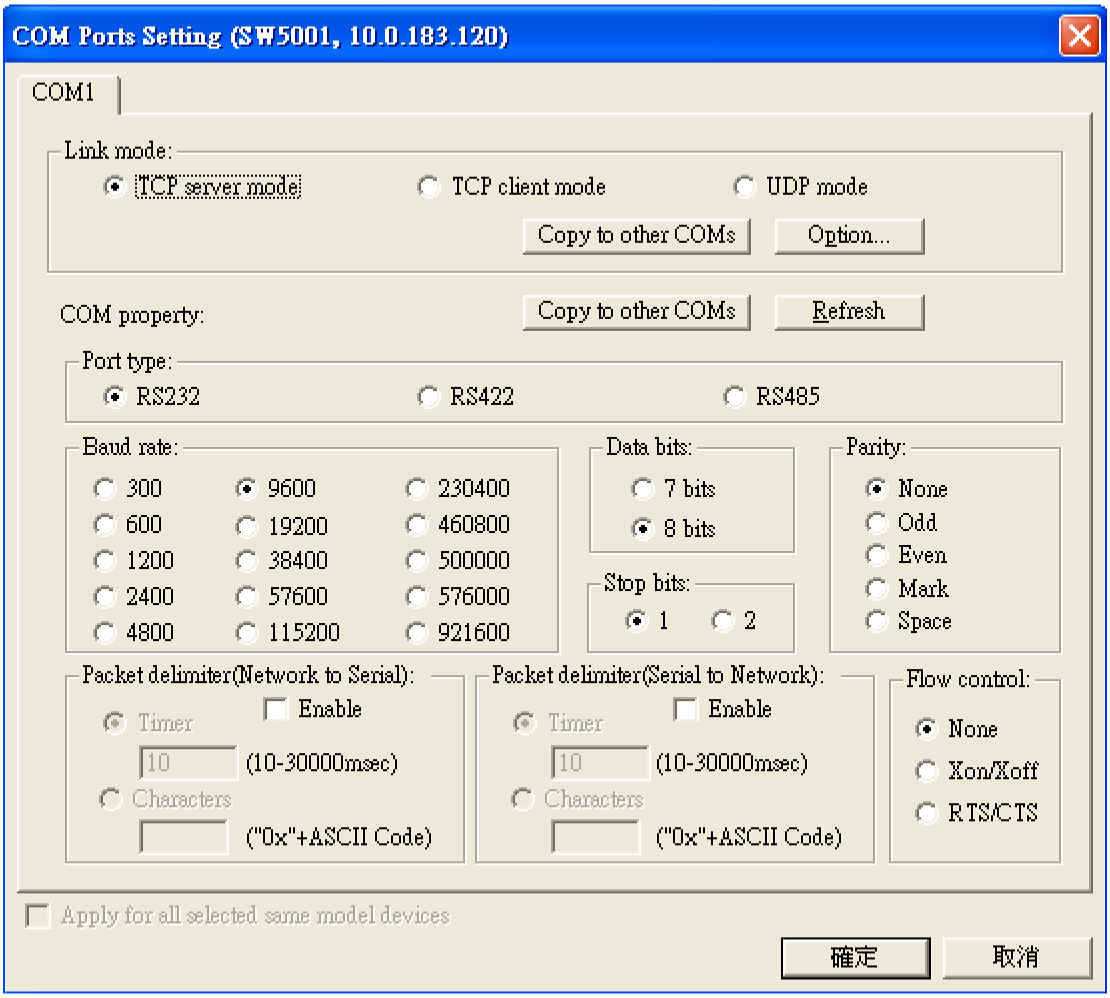
The user can modify the IP address of any selected device, shown as the figure below:



B3.4.2 COM Port …

ATOP has developed various network products, and some of the ATOP devices are specially supplied to some serial-port servers, while this function is applied to the configuration of COM port parameters.

Note: This function can be realized only after a successful login, shown as the figure below:

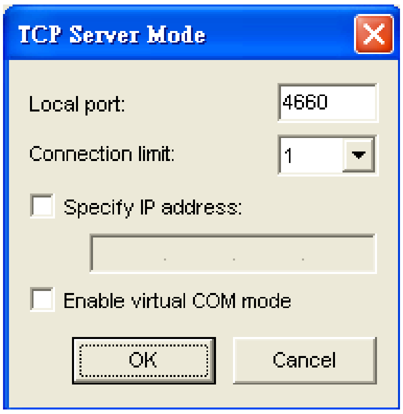


The user can also select several devices at one time, and carry out the configuration for them at the same time by selecting **Apply for all selected same model devices**

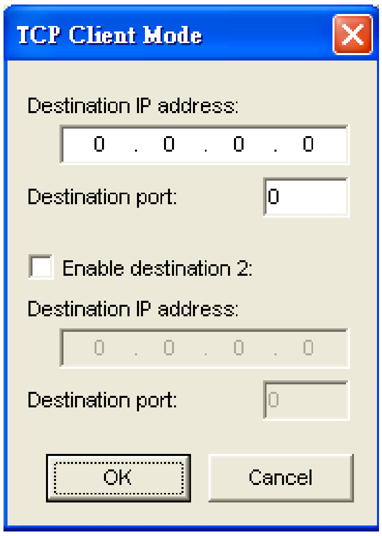
Note:

1、 COM tags: generated automatically according to the COM port number of the device. If a device has 4 COM port, there will be 4 tags: respectively COM1, COM2, COM3, COM4, and the like.

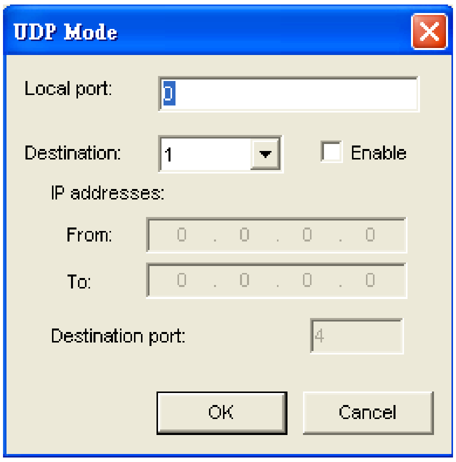
2、 Connecting mode: it means the connecting mode between the serial-port server and other network devices. Each COM corresponds to a connecting mode through which the transferring data will not be interfered by that in another connection. The user can set each corresponded connecting mode and the working parameter by clicking the button "Option", shown as the figure below:



TCP Server mode



TCP Client mode



UDP mode

3、 COM port property: it mainly represents the working parameter of the serial port setting, including: serial-port working type, baud rate, data bit, stop bit, parity bit, data packet delimiter and flow control, etc.

B3.4.3 Locate

The user can apply this function to locate a device when he knows it's IP address, but doesn't know its position. If a device is selected, the device will appear with singing by which the user can locate the device through the submenu option **Locate** or clicking the **Locate** button on the toolbar.

B3.4.4 Reset

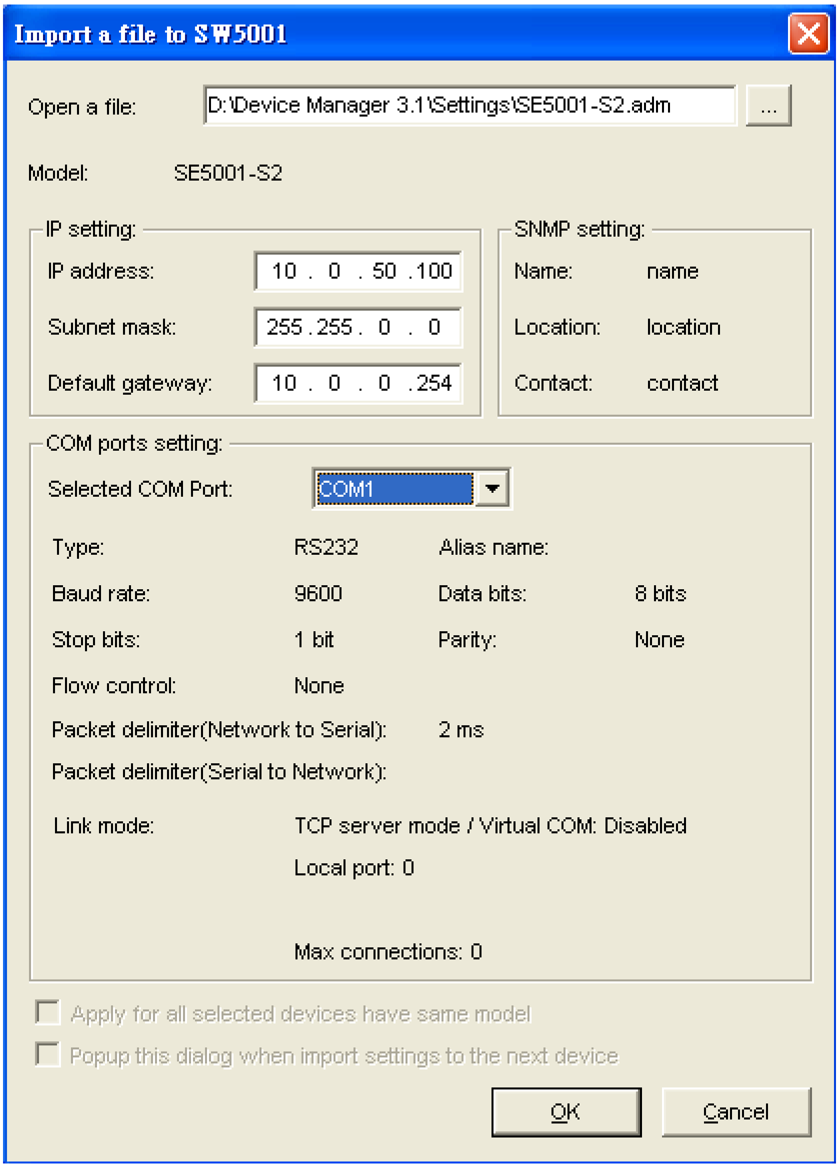
The device should be restarted after a successful modification of parameter configuration. And the user can carry out a restart through the submenu option **Reset**.

B3.4.5 Erase Flash

Some devices are supplied to the user with a certain capacity of Flash memory to save the user's data. And the user can erase the Flash through the submenu option **Erase Flash** or clicking the **Erase Flash** button on the toolbar when the memory capacity is to be used up or the history data are unnecessary to be saved.

B3.4.6 Import Setting …

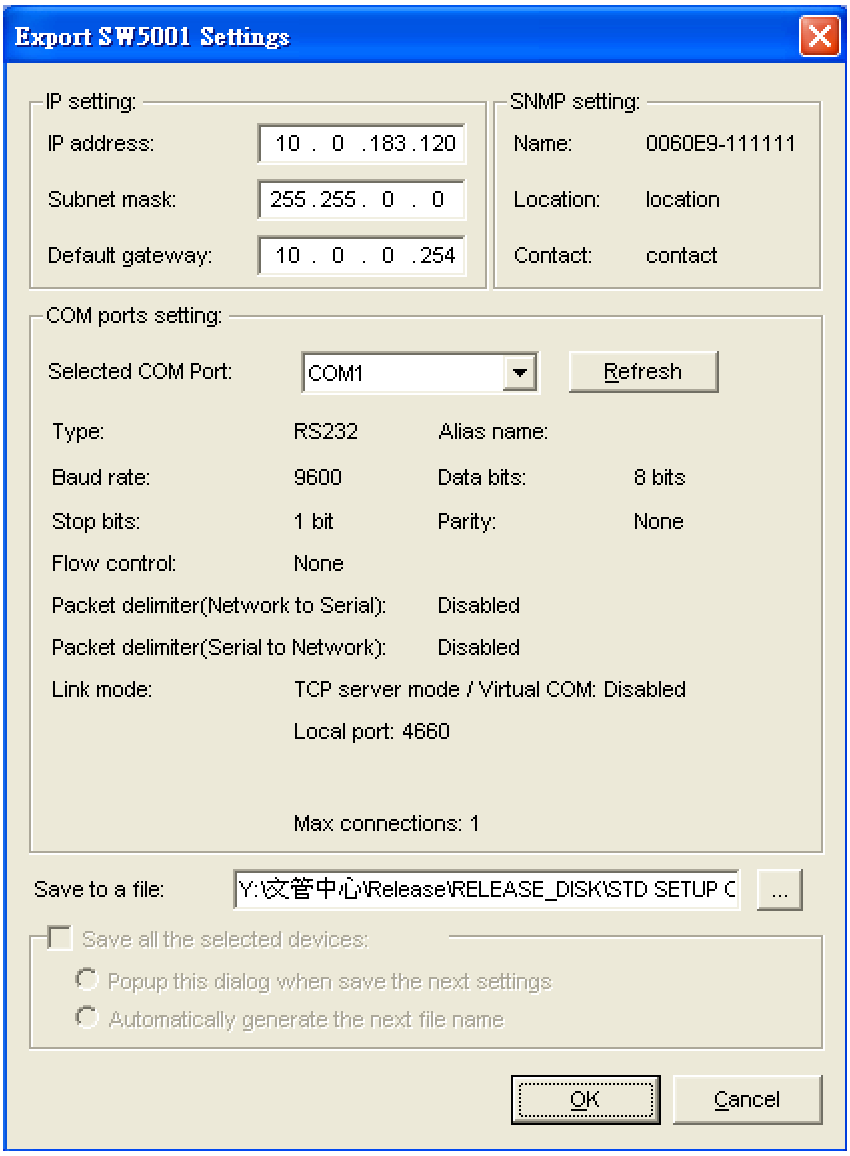
If a network has a large number of devices which are used for a same purpose, it would be very complicated to carry out the parameter configuration for each of the devices in the network one by one, while the user can import the parameter information of a standard parameter file directly into all the devices of the network through the submenu option **Import setting …** or clicking the **Import setting …** button on the toolbar, thus the work procedures can be largely reduced, shown as the figure below:



The user can also select several devices at one time, and lead the parameter information of a standard parameter file into all the selected devices by selecting **Apply for all selected devices have same model**.

B3.4.7 Export Setting…

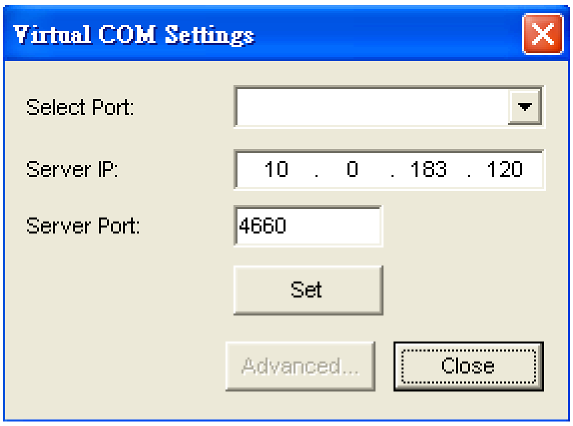
If a network has a large number of devices which are used for a same purpose, it would be very complicated to carry out the parameter configuration for each of the devices in the network one by one, while the user can save the parameter information of a standard device into a parameter file through the submenu option **Export setting…** or clicking the **Export setting…** button on the toolbar, thus the parameter information can be led in over again from this parameter file when the user is to carry out a configuration for any other device, shown as the figure below:



The user can also select several devices at one time, and save the parameter information of these selected devices into a designated parameter file by selecting "Save all the selected devices".

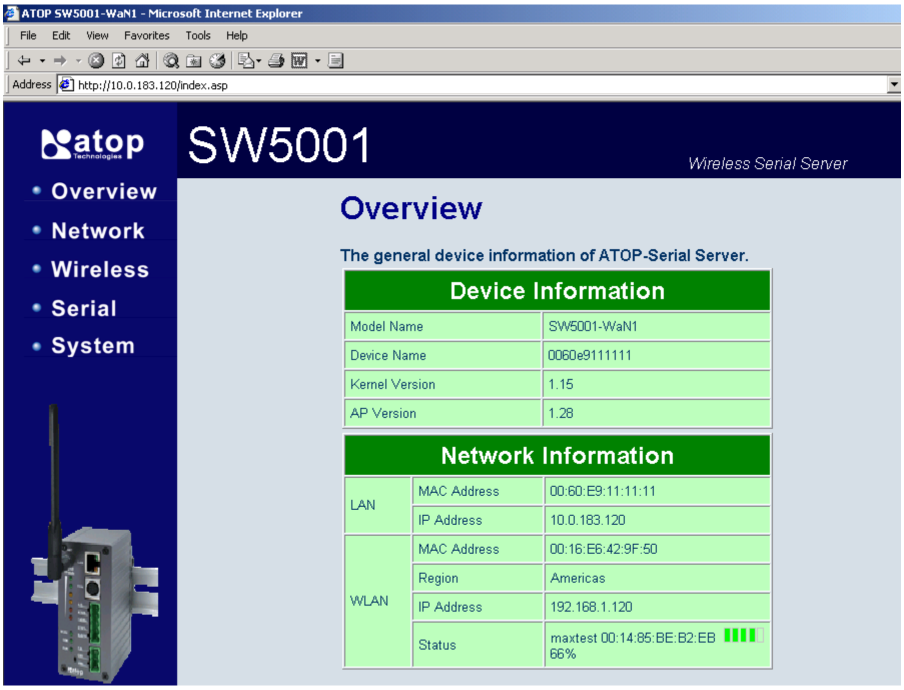
B3.4.8 Virtual COM

Some devices are supplied with the function of virtual serial port, and the user can carry out any related setting through the submenu option "Virtual COM", shown as the figure below:



B3.4.9 Configure by IE

Some devices are supplied with build-in Web servers, and the user can carry out any parameter setting directly through the submenu option **Config by IE**, shown as the figure below:



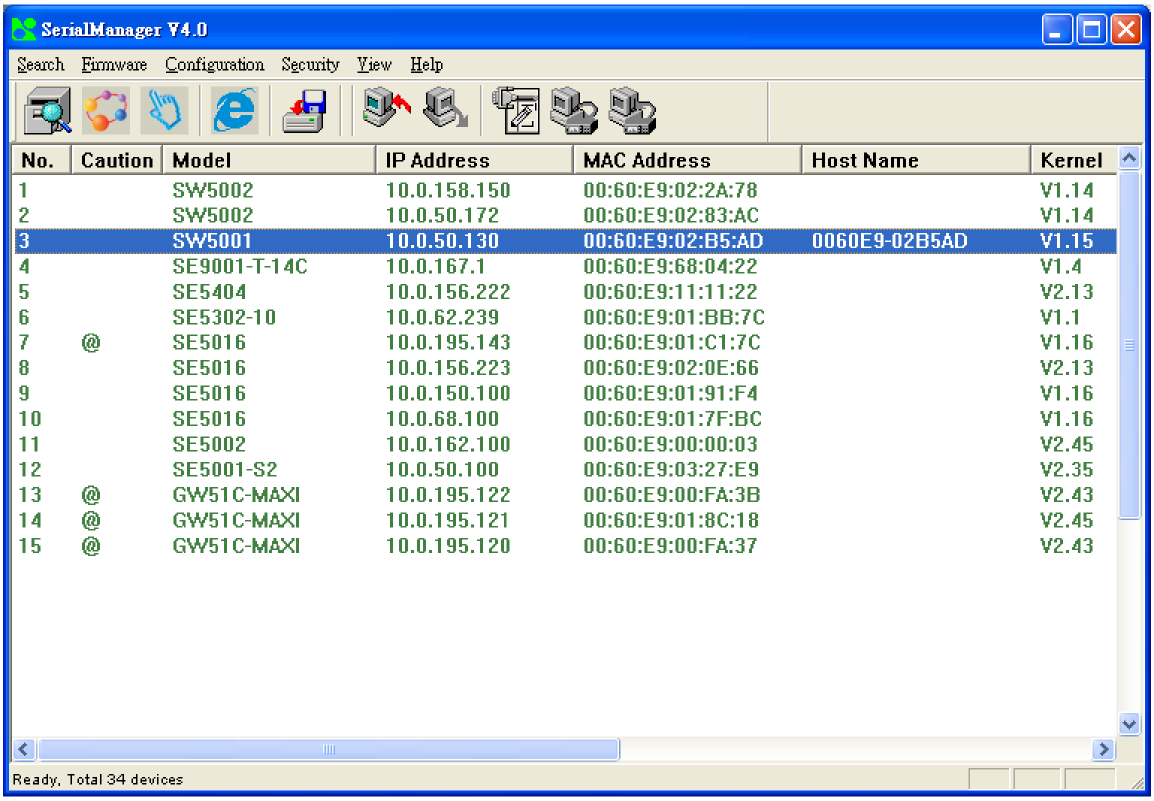
B3.4.10 Option

The option is mainly applied to setting some common work rules of SerialManager Utility, such as: search for the time interval of a network device, or whether to display any device indication and so on, shown as the figure below:



3.5 View

The user can select a display mode of the network device according to his/her own requirement through the menu option "View", such as: display in sequence of device module name, or display in sequence of IP address and so on, shown as the figure below:



B3.6 Help

This function is mainly applied to displaying some help information of the SerialManager utility, shown as the figure below:



Appendix C. Upgrading System Software

Updated version of firmware can be downloaded from www.atop.com.tw.

C.1. System Upgrading Procedures

Follow the upgrading procedures below for the latest firmware.

- Make sure the PC and SW5001 on the same network. Use command "**ping**" or **SerialManager**" utility program to verify their availability
- Edit "dll.bat " to fit the system requirements, Be sure to save all modifications
- Run dll.bat ,or type command and parameters by linux_dl_v2.exe, the following screen shall appear:

  linux_dl_v2.exe zImage.bin 10.0.152.100 (device's IP is 10.0.152.100)

※ **Tips : "linux_dl_v2.exe" is the upgraded executing file(can find on setup cd) and zImage.bin is the name of the firmware file; xxx.xxx.xxx.xxx is the IP address of SW5001.**

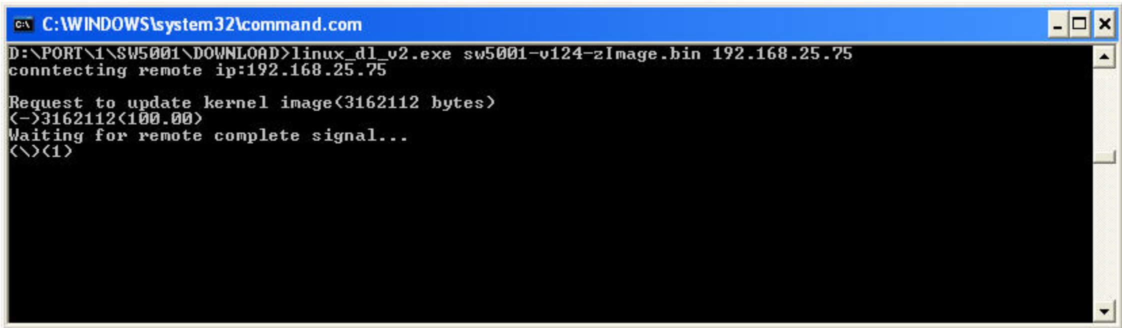


Fig 81. Start firmware upgrade perceudre for SW5001

SW5001 shall automatically perform the download at first phase, and restart after downloaded process at secondary phase

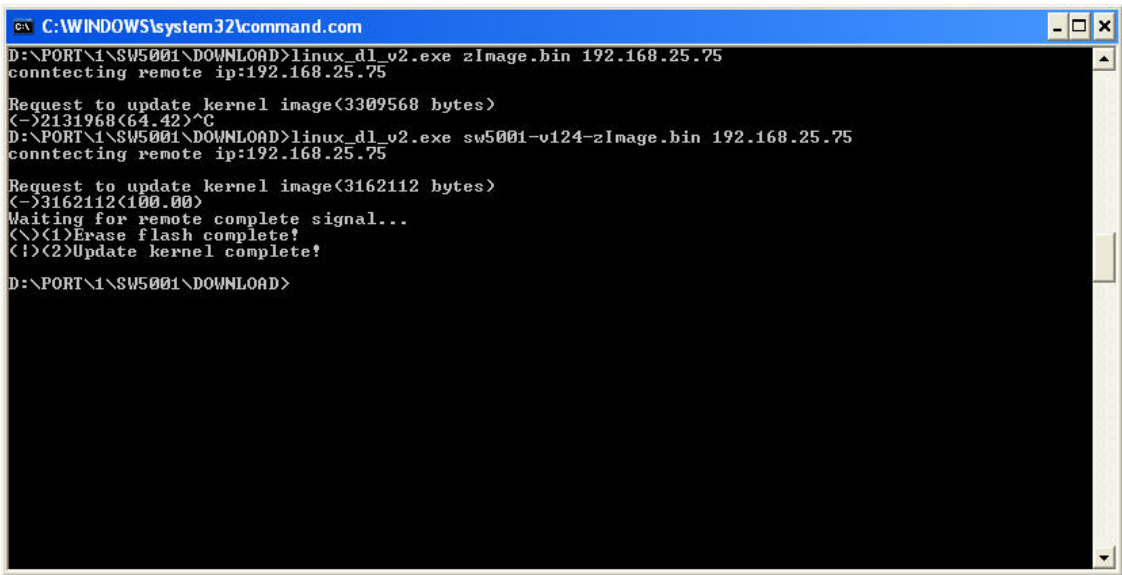


Fig 82. Connected & downloading process for SW5001's Upgrade

C.2. Critical Issues in Upgrading Process

If the upgrading is successful, SW5001 shall re-program the flash memory, and the buzzer will beep before restarting. It takes around 5 seconds to complete the re-programming. **If an error occurs during the process, SW5001 will clear the corresponding memories, and the system will remain the same as the one before the upgrading process**.

Appendix D. Specifications

D.1. Hardware Specifications

	Specifications
CPU	150MHz RISC with MMU support
Memory	Flash: 8MB /2MB for Bootloader / SDRAM: 16MBytes.
Interface	Mini-PCI Slot (for Wireless Module)
Watchdog	Hardware Watchdog Reset
Debug Port	CPU Build in Com.
Wireless LAN	Compliance for IEEE802.11b/g
	WEP 64-bit/128-bit data encryption
	WPA/WPA2-PSK Compatible (TKIP/AES Encryption)
	Mobile for Fast Roaming
	Modulation Type: CCK, DQPSK, DBPSK, OFDM (11g)
	Tx Power 11b: 14dBm / 11g: 13 dBm
	Rx Sensitivity: -66 dBm @ 54 Mbps, -80 dBm @ 11Mbps
	Transmission Rate: 54 Mbps (max.) with auto fallback
	Transmission distance: Up to 300 meters (@12 Mbps, in open areas)
	Antenna Connector: Reverse SMA
	Topologies: Infrastructure, Ad-Hoc
Ethernet	10/100M LAN (for Redundancy & Configuration)
	Protection: Built-in 1.5 KV magnetic isolation
	Configuration with Telnet/HTTP Protocol
Serial Port	Support RS232/485/422 & Software Selection
	Baud Rate: 110~921Kbps
	Parity Check: None/Odd/Even/Mark/Space
	Data Length: 7/8 Bit
	Stop Bit: 1/2
	Flow Control: None/ Software/ Hardware: RTS/CTS
	Terminal Block or Mini-DIN Connector with 15KV ESD
Power	Input: DC 9V-30V
	Consumption: 1.5 W (Tx Mode)
Software	Protocols: ICMP, IP, TCP, UDP, DHCP Client, Telnet, DNS, SNMP, HTTP, SMTP, SNTP
	Utilities: Windows utility for Windows 98/2000/XP/2003
	Virtual COM for Windows 98/2000/XP/2003
Configuration	Web browser
	Telnet Console
	Windows utility
Mechanical	HxWxD: 90mm x 45mm x 75mm
	Metal Housing for IP50 Standard

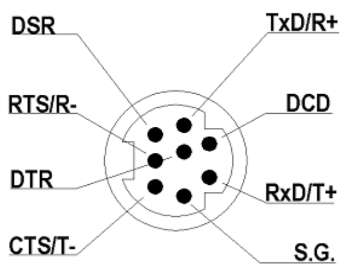
Environment	Operating: 0 to 60˚C (32 to 140˚F), 5 to 95% RH Storage: -20 to 85˚C (-4 to 185˚F), 5 to 95%RH

D.2. Software Specifications

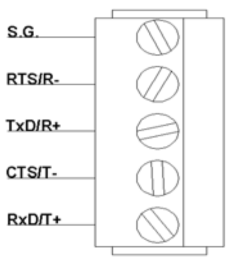
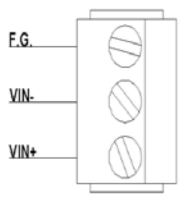
Item	Specifications
Protocol	ICMP, IP, TCP, UDP, DHCP Client, Telnet, DNS, SNMP, HTTP, SMTP, SNTP
Configuration	Configuration information for both TCP/IP and serial ports is kept in the EEPROM. Configuration utilities of Windows 95/98/2000/NT/XP/2003 are provided for configuring settings.
Internal Buffer Size	TCP receiving buffer size = 8K bytes TCP transmitting buffer size = 16K bytes RS-232/RS-485 receiving buffer size = 4K bytes RS-232/RS-485 transmitting buffer size = 4K bytes

D.3. Pin Assignments

Mini-DIN male connector pin assignments for Serial

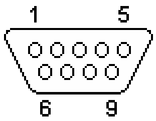
Mini-DIN	**Mini-Din**			
	Pin#	**RS-232**	**RS-485**	**RS-422**
	**1**	**DCD**		
	2	**RXD**		**Tx+**
	3	**TXD**	**Data+**	**Rx+**
	4	**DTR**		
	5	**SG (Signal Ground)**		
	6	**DSR**		
	7	**RTS**	**Data-**	**Rx-**
	8	**CTS**		**Tx-**

Terminal block pin assignments for Serial and Power

5-pin for serial connections		RS-232	RS-485	RS-422	**3-pin for Power input**		
	**SG**	GND	GND	GND		**FG**	FG
	RTS/R-	RTS	Data-	R-		**Vin-**	GND
	TxD/R+	TxD	Data+	R+		**Vin+**	9~30V
	CTS/T-	CTS		T-			
	RxD/T+	RxD		T+			

Mini DIN to DB9 cable, the DB9 connector pin assignments for Serial port:

DB9



Pin#	RS-232	RS-485	RS-422
1	DCD		
2	RXD		Tx+
3	TXD	Data+	Rx+
4	DTR		
5	SG (Signal Ground)		
6	DSR		
7	RTS	Data-	Rx-
8	CTS		Tx-
9	N/A	N/A	N/A

❈ **Note: RS-485 2 or 4 pins assignments of DB9 connector are different from those of Mini DIN connector.**

D.4. Beep & LED Status

Startup status

Message	Description
========^^^ (5sec)	Startup OK and AP firmware is enabled

❈ **Buzzer indication: " ^ " : Beep twice " = " : Beep off**

Wireless Signal Strength status

The BSS quality can be detected by LED indicator on SW5001. On running time, pressed default key and then released, one of the specified actions below shall be done that depend on the released time after you heard how many beeps. BSS quality is indicated by count of LEDs as shown below.

RSSI LEDs Message:

○ Off ● On ☼ blinking

Operations		Status*	LED1	LED2	LED3	LED4	LED5
Connecting	Search AP (sequentially blinking)	☼	☼	☼	☼	☼	☼
	Connected AP/ Get assigned IP	☼	☼	☼	☼	☼	☼
	Not matched SSID	☼					
	Not available IP	☼	☼				
Connected	Signal Strength is less 20%	●					
	Bad Signal Strength (20%)	●	●				
	Poor Signal Strength (40%)	●	●	●			
	Fair Signal Strength (60%)	●	●	●	●		
	Good Signal Strength (80%)	●	●	●	●	●	
	Excellent Signal Strength (100%)	●	●	●	●	●	●

❈ **Note: The lowest LED is indicated for STATUS at SW5001's front plate.**

WLAN LED Message

Message	Description
LED Off	No data is transmitting on Ethernet
LED blinking	Data is transmitting on Ethernet

COM Port LED Message

Message	Description
LED off	No data is transmitting on COM port
LED on blinking state	Data is transmitting on COM port

RUN LED Message

Message	Description
LED blinking (rate: 0.5Sec)	AP firmware is running